PREFACE

In 1993, the South Carolina Department of Health and Environmental Control (SCDHEC) published the first in a series of five watershed management documents. The third in that series, Watershed Water Quality Management Strategy: Catawba-Santee Basin communicated SCDHEC's innovative watershed approach, summarizing water programs and water quality in the basins. The approach continues to evolve and improve.

The watershed documents facilitate broader participation in the water quality management process. Through these publications, SCDHEC shares water quality information with internal and external partners, providing a common foundation for water quality improvement efforts at the local watershed or large-scale, often interstate, river basin level.

Water quality data from the Catawba River Basin were collected and assessed at the start of this second five-year watershed management cycle. The assessment incorporates data from many more sites than were included in the first round. This updated atlas provides summary information on a watershed basis, as well as geographical presentations of all permitted watershed activities. A waterbody index and a facility index allow the reader to locate information on specific waters and facilities of interest.

A brief summary of the water quality assessments included in the body of this document is provided following the Table of Contents. This summary lists all waters within the Catawba River Basin that fully support recreational and aquatic life uses, followed by those waters not supporting uses. In addition, the summaries list waters that have improved or degraded over the last 5 years since the original strategy was written. More comprehensive information can be found in the individual watershed sections. The information provided is accurate to the best of our ability at the time of writing and will be updated in five years.

As SCDHEC continues basinwide and statewide water quality protection and improvement efforts, we are counting on the support and assistance of all stakeholders in the Catawba River Basin to participate in bringing about water quality improvements. We look forward to working with you.

If you have questions or comments regarding this document, or if you are seeking further information on the water quality in the Catawba River Basin, please contact :

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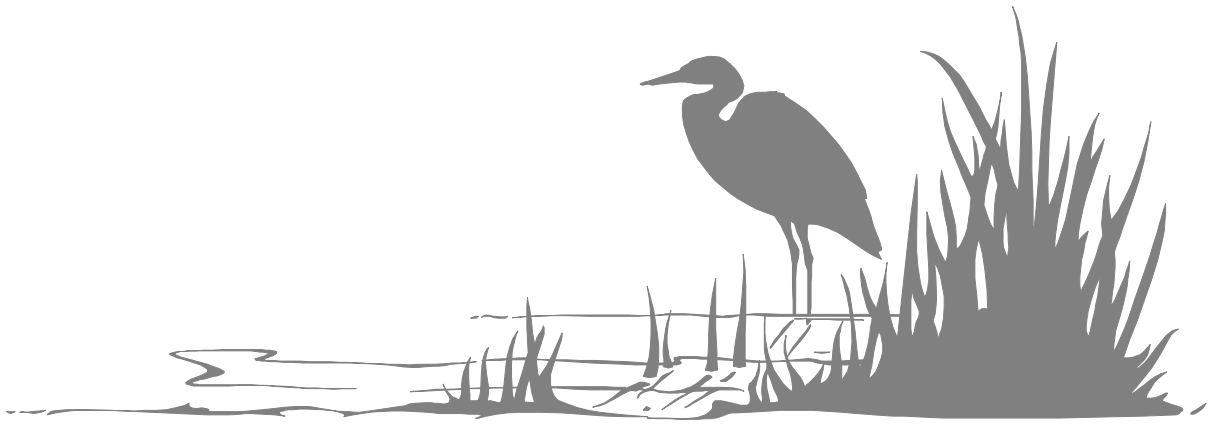

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Catawba River Basin - Sites that Improved from 1994 to 1998

REC = Recreational; AL = Aquatic Life; F = Fully Supported Standards; P = Partially Supported Standards; N = Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1993	1998	1993	1998	1993	1998
03050101-180	CW-197	Lake Wylie	AL	N	F	Copper, Zinc, Dissolved Oxygen		Decreasing Dissolved Oxygen	Decreasing Dissolved Oxygen; Increasing Turbidity
	CW-152	Crowders Creek	AL	N	F	Zinc		Increasing pH	Increasing TN
			REC	N	P	Fecal Coliform	Fecal Coliform		
	CW-023	Crowders Creek	AL	P	F	Zinc		Increasing pH	Increasing TN, TP
	CW-024	Crowders Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050103-010	CW-014	Catawba River	AL	P	F	Dissolved Oxygen			
	CW-174	Catawba River	AL	P	F	Dissolved Oxygen			
	CW-221	Catawba River Tributary	AL	N	F	Zinc, Copper			
03050103-020	CW-247	Sugar Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
	CW-246	Sugar Creek	AL	N	P	Macroinvertebrates	Macroinvertebrates		
	CW-009	Steele Creek	AL	P	F	Dissolved Oxygen			
	CW-011	Steele Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050103-040	CW-185	Cane Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
	CW-232	Rum Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050103-050	CW-005	Fishing Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050103-060	CW-008	Fishing Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050103-080	CW-235	Camp Creek	REC	N	P	Fecal Coliform	Fecal Coliform		

Catawba River Basin - Sites that Improved from 1994 to 1998

REC = Recreational; AL = Aquatic Life; F = Fully Supported Standards; P = Partially Supported Standards; N = Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1993	1998	1993	1998	1993	1998
03050104-010	CW-208	Lake Wateree	AL	N	P	Cadmium, Copper, Chromium, Zinc	pH		Decreasing Dissolved Oxygen; Increasing Turbidity, TP, TSS
	CW-207	Lake Wateree	AL	N	F	Cadmium, Copper, Chromium, Zinc			Decreasing Dissolved Oxygen; Increasing Turbidity, TSS
	CW-209	Lake Wateree	AL	P	F	Dissolved Oxygen			Decreasing Dissolved Oxygen, pH; Increasing Turbidity
	CW-040	Little Wateree Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050104-030	CW-019	Wateree River	AL	N	P	Dissolved Oxygen	Dissolved Oxygen		
03050104-050	CW-079	Sawneys Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050104-060	CW-229	Bear Creek	AL	P	F	Zinc			
			REC	N	P	Fecal Coliform	Fecal Coliform		
03050104-090	CW-155	Spears Creek	REC	P	F	Fecal Coliform		Increasing Turbidity	
	CW-166	Spears Creek	REC	N	P	Fecal Coliform	Fecal Coliform		

Catawba River Basin - Sites that Degraded from 1994 to 1998

REC = Recreational; AL = Aquatic Life; F = Fully Supported Standards; P = Partially Supported Standards; N = Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1993	1998	1993	1998	1993	1998
03050101-180	CW-024	Crowders Creek	AL	F	P		Macroinvertebrates		
03050103-020	CW-247	Sugar Creek	AL	F	N		Cadmium		
	CW-681	Steele Creek	AL	F	P		Macroinvertebrates		
03050103-030	CW-176	Sixmile Creek	AL	F	N		Zinc	Increasing TP, TN; Decreasing pH	Increasing BOD, TN; Decreasing pH
03050103-040	CW-210	Cane Creek	AL	F	P		Macroinvertebrates		
	CW-017	Cane Creek	REC	P	N	Fecal Coliform	Fecal Coliform		
	CW-151	Bear Creek	AL	P	N	Dissolved Oxygen	Dissolved Oxygen		Increasing pH
	CW-131	Bear Creek	AL	F	P		Dissolved Oxygen		
	CW-047	Gills Creek	AL	F	N		Dissolved Oxygen		Increasing pH
03050103-050	CW-005	Fishing Creek	AL	F	P		Macroinvertebrates		
03050103-060	CW-654	Fishing Creek	AL	F	P		Macroinvertebrates		Decreasing Dissolved Oxygen
	CW-096	Wildcat Creek	AL	F	N		Copper		Decreasing pH
03050103-070	CW-234	Tinkers Creek	AL	F	P		Macroinvertebrates		
	CW-227	Neelys Creek	REC	F	P		Fecal Coliform		
03050103-090	CW-002	Rocky Creek	AL	F	P		Macroinvertebrates	Decreasing Dissolved Oxygen	Decreasing Dissolved Oxygen, pH; Increasing TN
03050104-010	CW-040	Little Wateree Creek	AL	F	P		Dissolved Oxygen		Decreasing Dissolved Oxygen
03050104-030	CW-019	Wateree River	REC	F	P		Fecal Coliform		

Catawba River Basin - Sites that Degraded from 1994 to 1998

REC = Recreational; AL = Aquatic Life; F = Fully Supported Standards; P = Partially Supported Standards; N = Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1993	1998	1993	1998	1993	1998
03050104-030	CW-222	Wateree River	AL	F	N		Copper	Decreasing Dissolved Oxygen; Increasing Turbidity	Increasing Turbidity
03050104-060	CW-080	Twentyfive Mile Creek	AL	F	P		Macroinvertebrates, pH		
03050104-090	CW-154	Kelly Creek	REC	F	P		Fecal Coliform		Increasing pH

Fully Supported Sites in the Catawba River Basin

***** = Station not evaluated for Recreational Support; ****** = Not a Predictor of Future Impairment

Watershed	Sta #	Waterbody Name	Improving Trends	Other Trends**
03050101-180	CW-197	Lake Wylie		Decreasing Dissolved Oxygen, pH; Increasing Turbidity
	CW-245	Lake Wylie		
	CW-198	Lake Wylie		Decreasing Dissolved Oxygen
	CW-230	Lake Wylie		
	CW-696*	Beaverdam Creek		
03050101-190	CW-694 *	Allison Creek	Decreasing BOD, TP	Decreasing pH
	CW-200	Allison Creek arm of Lake Wylie	Decreasing BOD, TN	Decreasing Dissolved Oxygen
	CW-201	Allison Creek arm of Lake Wylie		
03050103-010	CW-014	Catawba River		
	CW-041	Catawba River	Decreasing BOD, TN, Fecal Coliform	Decreasing pH
	CW-016	Catawba River	Decreasing TSS	Increasing TP
03050103-050	CW-031*	Fishing Creek		
03050103-080	CW-084*	Camp Creek		
03050103-090	CW-067*	Little Rocky Creek		
03050104-010	CW-231	Catawba River		
	CW-692*	Dutchman Creek		
	CW-076*	Beaver Creek		
	CW-693*	White Oak Creek		
03050104-030	CW-206	Wateree River	Decreasing TN	Decreasing pH

Fully Supported Sites in the Catawba River Basin

***** = Station not evaluated for Recreational Support; ****** = Not a Predictor of Future Impairment

Watershed	Sta #	Waterbody Name	Improving Trends	Other Trends**
03050104-040	CW-077*	Flat Rock Creek		
	CW-078*	Grannies Quarter Creek		
03050104-050	CW-075*	Thorntree Creek		
03050104-070	CW-223	Little Pine Tree Creek	Decreasing BOD	Increasing Turbidity
	CL-078	Adams Mill Pond		
03050104-080	CW-238	Swift Creek		
03050104-090	CW-155	Spears Creek		Increasing pH, TN, Turbidity
03050104-100	CW-240	Colonels Creek		

Impaired Sites in the Catawba River Basin

REC = Recreational; AL = Aquatic Life; P = Partially Supported Standards; N = Nonsupported Standards; * = Eutrophication Assessment; ** = Not a Predictor of Future Impairment

Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050101-180	CW-027	Lake Wylie	REC	P	Fecal Coliform		Increasing BOD
	CW-152	Crowders Creek	REC	P	Fecal Coliform	Increasing Fecal Coliform	Decreasing pH
	CW-023	Crowders Creek	REC	N	Fecal Coliform		Increasing TN
	CW-024	Crowders Creek	AL	P	Macroinvertebrates		
			REC	P	Fecal Coliform		
	CW-192	South Fork	REC	N	Fecal Coliform		
	CW-105	Brown Creek	REC	N	Fecal Coliform		
	CW-153	Beaverdam Creek	REC	N	Fecal Coliform		Decreasing pH
03050101-190	CW-171	Allison Creek	REC	N	Fecal Coliform		
	CW-134	Calabash Branch	REC	N	Fecal Coliform		
03050103-010	CW-174	Catawba River	REC	P	Fecal Coliform	Increasing Fecal Coliform	Decreasing pH
	CW-221	Catawba River Tributary	REC	N	Fecal Coliform		
	CW-016F	Fishing Creek Res.	AL	*	Nutrients	Increasing TP, TN	Increasing Turbidity
	CW-057	Fishing Creek Res.	AL	*	Nutrients		Increasing Turbidity
	CW-033	Cedar Creek Res.	AL	*	Nutrients		
03050103-020	CW-247	Sugar Creek	AL	N	Cadmium		
			REC	P	Fecal Coliform		
	CW-246	Sugar Creek	AL	P	Macroinvertebrates		
			REC	N	Fecal Coliform		

Impaired Sites in the Catawba River Basin

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Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050103-020	CW-013	Sugar Creek	AL	N	Chromium, Copper		Increasing TP, pH
			REC	N	Fecal Coliform		
	CW-036	Sugar Creek	REC	N	Fecal Coliform		
	CW-248	Little Sugar Creek	REC	N	Fecal Coliform		
	CW-226	McAlpine Creek	REC	N	Fecal Coliform	Increasing Fecal Coliform	Increasing BOD, TP; Decreasing pH
	CW-064	McAlpine Creek	AL	N	Macroinvertebrates	Increasing Fecal Coliform	
			REC	N	Fecal Coliform		
	CW-009	Steele Creek	REC	N	Fecal Coliform		Decreasing pH
	CW-203	Steele Creek	REC	N	Fecal Coliform		
	CW-681	Steele Creek	AL	P	Macroinvertebrates		
	CW-011	Steele Creek	REC	P	Fecal Coliform		
03050103-030	CW-083	Twelvemile Creek	REC	N	Fecal Coliform		
	CW-176	Sixmile Creek	AL	N	Zinc		Increasing BOD, TN; Decreasing pH
			REC	N	Fecal Coliform		
	CW-145	Waxhaw Creek	REC	N	Fecal Coliform		
03050103-040	CW-185	Cane Creek	AL	P	Dissolved Oxygen		
			REC	P	Fecal Coliform		
	CW-210	Cane Creek	AL	P	Macroinvertebrates		
	CW-017	Cane Creek	AL	N	Dissolved Oxygen		
			REC	N	Fecal Coliform		

Impaired Sites in the Catawba River Basin

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Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050103-040	CW-151	Bear Creek	AL	N	Dissolved Oxygen		Increasing pH
			REC	N	Fecal Coliform		
	CW-131	Bear Creek	AL	P	Dissolved Oxygen	Increasing Fecal Coliform	
			REC	N	Fecal Coliform		
	CW-047	Gills Creek	AL	N	Dissolved Oxygen		Increasing pH
			REC	N	Fecal Coliform		
	CW-232	Rum Creek	AL	N	Dissolved Oxygen		
			REC	P	Fecal Coliform		
03050103-050	CW-029	Fishing Creek	REC	N	Fecal Coliform		
	CW-005	Fishing Creek	AL	P	Macroinvertebrates		
			REC	P	Fecal Coliform		
	CW-225	Fishing Creek	REC	N	Fecal Coliform		Decreasing pH
03050103-060	CW-224	Fishing Creek	REC	N	Fecal Coliform		Decreasing pH
	CW-654	Fishing Creek	AL	P	Macroinvertebrates		
	CW-008	Fishing Creek	REC	P	Fecal Coliform	Increasing Fecal Coliform	Decreasing pH
	CW-233	Fishing Creek	REC	P	Fecal Coliform		
	CW-007	South Fork Fishing Creek	AL	P	Macroinvertebrates		
	CW-006	Wildcat Creek	REC	N	Fecal Coliform		

Impaired Sites in the Catawba River Basin

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Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050103-060	CW-096	Wildcat Creek	AL	N	Copper		Decreasing pH
			REC	N	Fecal Coliform		
	CW-212	Tools Fork	REC	N	Fecal Coliform		Increasing TP; Decreasing pH
	CW-697	Stoney Fork	AL	P	Macroinvertebrates		
	CW-695	Taylor Creek	AL	P	Macroinvertebrates		
03050103-070	CW-234	Tinkers Creek	AL	P	Macroinvertebrates		
			REC	P	Fecal Coliform		
	CW-234	Neelys Creek	REC	P	Fecal Coliform		Decreasing pH
03050103-080	CW-235	Camp Creek	REC	P	Fecal Coliform		
03050103-090	CW-002	Rocky Creek	AL	P	Macroinvertebrates	Increasing Fecal Coliform	Decreasing pH, Dissolved Oxygen; Increasing TN
			REC	N	Fecal Coliform		
	CW-236	Rocky Creek	REC	N	Fecal Coliform		
	CW-175	Rocky Creek	REC	N	Fecal Coliform		Decreasing pH
	CW-088	Grassy Run Branch	AL	N	Dissolved Oxygen	Decreasing Dissolved Oxygen	
			REC	N	Fecal Coliform		
	CW-691	Beaverdam Creek	AL	P	Macroinvertebrates		
03050104-010	CW-208	Lake Wateree	AL	P	pH		Decreasing Dissolved Oxygen; Increasing Turbidity, TP, TSS
				*	Nutrients		
	CW-207	Lake Wateree	AL	*	Nutrients		Decreasing Dissolved Oxygen; Increasing Turbidity, TSS

Impaired Sites in the Catawba River Basin

REC = Recreational; AL = Aquatic Life; P = Partially Supported Standards; N = Nonsupported Standards; * = Eutrophication Assessment; ** = Not a Predictor of Future Impairment

Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050104-010	CW-209	Lake Wateree	AL	*	Nutrients		Decreasing Dissolved Oxygen, pH; Increasing Turbidity
	CW-040	Little Wateree Creek	AL	P	Dissolved Oxygen	Decreasing Dissolved Oxygen	
			REC	P	Fecal Coliform		
03050104-020	CW-072	Big Wateree Creek	REC	N	Fecal Coliform		
03050104-030	CW-019	Wateree River	AL	P	Dissolved Oxygen	Increasing Fecal Coliform	
			REC	P	Fecal Coliform		
	CW-222 & SC-002	Wateree River	AL	N	Copper	Increasing Fecal Coliform	Increasing Turbidity
03050104-050	CW-228	Sawneys Creek	REC	N	Fecal Coliform		
	CW-079	Sawneys Creek	REC	P	Fecal Coliform		
03050104-060	CW-228	Twentyfive Mile Creek	AL	P	Macroinvertebrate, pH		
			REC	P	Fecal Coliform		
	CW-229	Bear Creek	REC	N	Fecal Coliform		
03050104-090	CW-166	Spears Creek	REC	P	Fecal Coliform		
	CW-154	Kelly Creek	REC	P	Fecal Coliform		Increasing pH

Introduction

The South Carolina Department of Health and Environmental Control (SCDHEC or the Department) initiated its first watershed planning activities as a result of a U.S. Environmental Protection Agency (USEPA) grant in June of 1972. These activities were soon extended by §303(e), "Federal Water Pollution Control Act Amendments of 1972", U.S. Public Law 92-500. In 1975, the SCDHEC published basin planning reports for the four major basins in South Carolina. The next major planning activity resulted from §208 of the Federal Water Pollution Control Act, which required states to prepare planning documents on an areawide basis. Areawide plans were completed in the late 1970's for the five designated areas of the State and for the nondesignated remainder of the State. To date, these plans or their updated versions have served as information sources and guides for water quality management.

The Bureau of Water emphasizes watershed planning to better coordinate river basin planning and water quality management. Watershed-based management allows the Department to address Congressional and Legislative mandates in a coordinated manner and to better utilize current resources. The watershed approach also improves communication between the Department, the regulated community, and the public on existing and future water quality issues.

Purpose of the Watershed Water Quality Assessment

A watershed is a geographic area into which the surrounding waters, sediments, and dissolved materials drain, and whose boundaries extend along surrounding topographic ridges. Watershed-based water quality management recognizes the interdependence of water quality related activities associated with a drainage basin including: monitoring, problem identification and prioritization, water quality modeling, planning, permitting, and other activities. The Bureau of Water's Watershed Water Quality Management Program integrates these activities by watershed, resulting in watershed management plans that appropriately focus water quality protection efforts. While an important aspect of the program is water quality problem identification and solution, the emphasis is on problem prevention.

The Department has divided the State into five regions (areas consisting of one or more river basins), along hydrologic lines, which contain approximately the same number of NPDES permitted dischargers. A Watershed Water Quality Assessment (WWQA) will be created for each river basin within the five regions and will be updated on a five-year rotational basis. This will allow for effective allocation and coordination of water quality activities and efficient use of available resources. The Catawba River Basin is subdivided into 29 watersheds or hydrologic units. The hydrologic units used are the USDA Natural Resource Conservation Service 11-digit codes for South Carolina. All water quality related evaluations will be made at the watershed level. The stream names used are derived from USGS topographic maps. USEPA Reach data (RF3) were used for the digital hydrography and stream length estimates. Based on the blue line streams of the USGS topo maps, it is likely that portions of the stream network in terms of perennial, intermittent, and ephemeral streams are not represented.

The watershed-based assessments fulfill a number of USEPA reporting requirements including various activities under §303(d), §305(b), §314, and §319 of the Clean Water Act (CWA). Section 303(d)

requires a listing of waters located within a watershed which do not meet applicable water quality standards. Section 305(b) requires that the State biennially submit a report that includes a water quality description and analysis of all navigable waters to estimate environmental impacts. Section 314 requires that the State submit a biennial report that identifies, classifies, describes, and assesses the status and trends in water quality of publicly owned lakes. The watershed plan is also a logical evaluation, prioritization, and implementation tool for nonpoint source (§319) requirements. Nonpoint source best management practices (BMPs) can be selected by identifying water quality impairments and necessary controls, while considering all the activities occurring in the drainage basin.

The assessment also allows for more efficient issuance of National Pollutant Discharge Elimination System (NPDES) and State wastewater discharge permits. Proposed permit issuances within a watershed may be consolidated and presented to the public in groups, rather than one at a time, allowing the Department to realize a resource savings, and the public to realize an information advantage.

The Watershed Water Quality Assessment (WWQA) is a geographically-based document that describes, at the watershed level, all water quality related activities that may potentially have a negative impact on water quality. The Watershed Implementation Staff investigates the impaired streams mentioned in the WWQA to determine, where possible, the source of the impairment and recommends solutions to correct the problems. As part of this effort, the watershed staff is forging partnerships with various federal and state agencies, local governments, and community groups. In particular, the Department's Watershed Program and the Natural Resource Conservation Service (NRCS) district offices are working together to address some of the nonpoint source (NPS) concerns in the basin. By combining NRCS's local knowledge of land use and the Department's knowledge of water quality, we are able to build upon NRCS's close relationships with landowners and determine where NPS projects are needed. These projects may include educational campaigns or special water quality studies.

Factors Assessed in Watershed Evaluations

Water Quality

The Water Program comprises activities within SCDHEC's Bureau of Water and Bureau of Environmental Services. The Program's objectives are to ensure that the water in South Carolina is safe for drinking and recreation, and that it is suitable to support and maintain aquatic flora and fauna. Functions include planning, permitting, compliance assurance, enforcement, and monitoring. This section provides an overview of water quality evaluation and protection activities.

Monitoring

In an effort to evaluate the State's water quality, the Department operates and collects data from a permanent Statewide network of primary and secondary ambient monitoring stations and flexible, rotating watershed monitoring stations. The ambient monitoring network is directed toward determining long-term water quality trends, assessing attainment of water quality standards, identifying locations in need of additional attention, and providing background data for planning and evaluating stream classifications and standards.

Ambient monitoring data are also used in the process of formulating permit limits for wastewater discharges with the goal of maintaining State and Federal water quality standards and criteria in the receiving streams in accordance with the goals of the Clean Water Act. These standards and criteria define the instream chemical concentrations that provide for protection and reproduction of aquatic flora and fauna, help determine support of the classified uses of each waterbody, and serve as instream limits for the regulation of wastewater discharges or other activities. In addition, these data are used in the preparation of the biennial §305(b) report to Congress, which summarizes the State's water quality with respect to attainment of classified uses by comparing the ambient monitoring network data to the State Water Quality Standards.

SCDHEC’s ambient water quality monitoring network comprises three station types: primary (P), secondary (S), and watershed (W) stations. Primary stations are sampled on a monthly basis year round, and are located in high water-use areas or upstream of high water-use areas. The static primary station network is operated statewide, and receives the most extensive parameter coverage, thus making it best suited for detecting long term trends.

Secondary stations are sampled monthly from May through October, a period critical to aquatic life, and is characterized by higher water temperatures and lower flows. Secondary stations are located in areas where specific monitoring is warranted due to point source discharges, or in areas with a history of water quality problems. Secondary station parameter coverage is less extensive and more flexible than primary or watershed station coverages. The number and locations of secondary stations have greater annual variability than do those in the primary station network, and during a basin's target year may have parameter coverage and sampling frequency duplicating that of primary or watershed stations.

Watershed stations are sampled on a monthly basis, year round, during a basin's target year. Additional watershed stations may be sampled monthly from May through October to augment the

secondary station network. Watershed stations are located to provide more complete and representative coverage within the larger drainage basin, and to identify additional monitoring needs. Watershed stations have the same parameter coverage as primary stations.

Many pollutants may be components of point source discharges, but may be discharged in a discontinuous manner, or at such low concentrations that water column sampling for them is impractical. Some pollutants are also common in nonpoint source runoff, reaching waterways only after a heavy rainfall; therefore, in these situations, the best media for the detection of these chemicals are sediment and fish tissue where they may accumulate over time. Their impact may also affect the macroinvertebrate community.

Ambient trend monitoring is conducted to collect data to indicate general biological conditions of State waters which may be subject to a variety of point and nonpoint source impacts. In 1991, the Department began incorporating ambient macroinvertebrate data into the development of Watershed Water Quality Assessments. Ambient sampling is also used to establish regional reference or "least impacted" sites from which to make comparisons in future monitoring. Additionally, special macroinvertebrate studies, in which stream specific comparisons among stations located upstream and downstream from a known discharge or nonpoint source area, are used to assess impact.

Qualitative sampling of macroinvertebrate communities are the primary bioassessment techniques used in ambient trend monitoring. A habitat assessment of general stream habitat availability and a substrate characterization is conducted at each site. Annual ambient monitoring is conducted during low flow "worst case" conditions in July - September. Some coastal plain streams that have no flow conditions in the summer months may be sampled in the winter (January-March). This technique may also be used in special studies for the purpose of determining if, and to what extent, a wastewater discharge or nonpoint source runoff is impacting the receiving stream. A minimum of two sample locations, one upstream and one downstream from a discharge or runoff area, is collected. At least one downstream recovery station is also established when appropriate. Sampling methodology follows procedures described in Standard Operating Procedures, Biological Monitoring.

Aquatic sediments represent a historical record of chronic conditions existing in the water column. Pollutants bind to particulate organic matter in the water column and settle to the bottom where they become part of the sediment "record". Accumulated sediments not only reflect the impact of point source discharges, but also incorporate nonpoint source pollution washed into the stream during rain events. As a result, contaminant concentrations originating from irregular and highly variable sources are recorded in the sediment. The sediment concentrations at a particular location do not vary as rapidly with time as do the water column concentrations. Thus, the sediment record may be read at a later time, unrelated to the actual release time. Lakes act as settling basins for materials entering the lake system directly from a discharge or indirectly from the land surface washed into streams. Therefore, it is not unusual for lake sediment concentrations to be higher than sediment concentrations found in streams. This is especially true for chromium, copper, and zinc.

The ambient monitoring program, has the capability of sampling a wide range of media and analyzing them for the presence or effects of contaminants. Ambient monitoring data from 25 primary (P) stations, 32 secondary (S) stations, and 24 watershed (W) stations were reviewed for the Catawba River

Basin, along with 30 biological (BIO) stations to assess macroinvertebrate communities, and 1 South Carolina Public Service Authority (Santee Cooper) station.

Classified Waters, Standards, and Natural Conditions

The waters of the State have been classified in regulation based on the desired uses of each waterbody. State standards for various parameters have been established to protect all uses within each classification. The water-use classifications that apply to this basin are as follows.

Class ORW, or "outstanding resource waters", are freshwaters or saltwaters which constitute an outstanding recreational or ecological resource, or those freshwaters suitable as a source for drinking water supply purposes, with treatment levels specified by the Department.

Class A were freshwaters which were suitable for primary contact recreation. This class was also suitable for uses listed as Class B. As of April, 1992, Class A and Class B waters were reclassified as Class FW which protects for primary contact recreation.

Class B were freshwaters which were suitable for secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters were suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class was also suitable for industrial and agricultural uses. The main difference between the Class A and B freshwater was the fecal coliform standard. Class A waters were not to exceed a geometric mean of 200/100ml, based on 5 consecutive samples during any 30 day period; nor were more than 10% of the total samples during any 30 day period to exceed 400/100ml. Class B waters were not to exceed a geometric mean of 1000/100ml, based on 5 consecutive samples during any 30 day period; nor were more than 20% of the total samples during any 30 day period to exceed 2000/100ml. As of April, 1992, Class A and Class B waters were reclassified as Class FW, which protects for primary contact recreation.

Class Trout Waters is comprised of three types of water:

trout natural waters, which are freshwaters suitable for supporting reproducing trout populations and a cold water balanced indigenous aquatic community of fauna and flora,

trout put, grow and take waters, which are freshwaters suitable for supporting the growth of stocked trout populations and a balanced indigenous aquatic community of fauna and flora,

trout put and take waters, which are freshwaters protected by the standards of Class FW.

Class FW, or "freshwaters", are freshwaters which are suitable for primary and secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters are suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class is also suitable for industrial and agricultural uses.

Site specific numeric standards (*) for surface waters may be established by the Department to replace the numeric standards found in Regulation 61-68 or to add new standards not contained in R.61-68. Establishment of such standards shall be subject to public participation and administrative procedures for adopting regulations. In addition, such site specific numeric standards shall not apply to tributary or downstream waters unless specifically described in the water classification listing in R.61-69.

The standards are used as instream water quality goals to maintain and improve water quality and also serve as the foundation of the Bureau of Water's program. They are used to determine permit limits for treated wastewater dischargers and any other activities that may impact water quality. Using mathematical

Wasteload Allocation Models, the impact of a wastewater discharge on a receiving stream, where flow is unregulated by dams, is predicted using 7Q10 streamflows. These predictions are then used to set limits for different pollutants on the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The NPDES permit limits are set so that, as long as a permittee (wastewater discharger) meets the established permit limits, the discharge should not cause a standards violation in the receiving stream. All discharges to the waters of the State are required to have an NPDES permit and must abide by those limits, under penalty of law.

Classifications are based on desired uses, not on natural or existing water quality, and are a legal means to obtain the necessary treatment of discharged wastewater to protect designated uses. Actual water quality may not have a bearing on a waterbody's classification. A waterbody may be reclassified if desired or existing public uses justify the reclassification and the water quality necessary to protect these uses is attainable. A classification change is an amendment to a State regulation and requires public participation, SCDHEC Board approval, and General Assembly approval.

Natural conditions may prevent a waterbody from meeting the water quality goals as set forth in the standards. The fact a waterbody does not meet the specified numeric standards for a particular classification does not mean the waterbody is polluted or of poor quality. Certain types of waterbodies (ie. swamps, lakes, tidal creeks) may naturally have water quality lower than the numeric standards. A waterbody can have water quality conditions below standards due to natural causes and still meet its use classification. A site specific numeric standard may be established by the Department after being subjected to public participation and administrative procedures for adopting regulations. Site specific numeric standards apply only to the stream segment described in the water classification listing, not to tributaries or downstream unspecified waters.

Lake Trophic Status

Trophic status is a characterization of a lake's biological productivity based on the availability of plant nutrients, especially phosphorus. Commonly accepted systems for describing trophic status recognize a range of conditions, with "oligotrophic" indicating the least biologically productive lakes and "eutrophic" indicating significantly higher levels of productivity. A lake's trophic condition may shift over time. The trophic condition of South Carolina lakes is monitored through SCDHEC’s network of routine sampling stations and through periodic sampling of additional lakes. All lakes of at least 40 acres in area that offer public access are monitored.

Most commonly, large external inputs of nutrients from point and/or nonpoint sources lead to advanced eutrophication. Advanced eutrophication is indicated by excessive algal growth, rapid sedimentation, and seasonal or daily dissolved oxygen deficiencies. Advanced eutrophication can cause undesirable shifts in the composition of aquatic life, or even fish kills. Restoring a lake to a more desirable trophic condition requires reductions in nutrient inputs, usually phosphorus.

WATER QUALITY INDICATORS

Water quality data are used to describe the condition of a waterbody, to help understand why that condition exists, and to provide some clues as to how it may be improved. Water quality indicators include physical, chemical, and biological measurements. Copies of the Standard Operating Procedures used for these measurements are available from the Department's Bureau of Water and the Bureau of Environmental Services.

MACROINVERTEBRATE COMMUNITY

Macroinvertebrates are aquatic insects and other aquatic invertebrates associated with the substrates of waterbodies (including, but not limited to, streams and rivers). Macroinvertebrates can be useful indicators of water quality because these communities respond to integrated stresses over time which reflect fluctuating environmental conditions. Community responses to various pollutants (e.g. organic, toxic, and sediment) may be assessed through interpretation of diversity, known organism tolerances, and in some cases, relative abundances and feeding types.

FISH TISSUE

Many pollutants occur in such low concentrations in the water column that they are usually below analytical detection limits. Over time many of these chemicals may accumulate in fish tissue to levels that are easily measured. By analyzing fish tissue it is possible to see what pollutants may be present in waterbodies at very low levels. This information can also be used to determine if consumption of the fish pose any undue human health concerns and to calculate consumption rates that are safe.

DISSOLVED OXYGEN

Oxygen is essential for the survival and propagation of aquatic organisms. If the amount of oxygen dissolved in water falls below the minimum requirements for survival, aquatic organisms or their eggs and larvae may die. A severe example is a fish kill. Dissolved oxygen (DO) varies greatly due to natural phenomena, resulting in daily and seasonal cycles. Different forms of pollution also can cause declines in DO.

Changes in DO levels can result from temperature changes or the activity of plants and other organisms present in a waterbody. The natural diurnal (daily) cycle of DO concentration is well documented. Dissolved oxygen concentrations are generally lowest in the morning, climbing throughout the day due to photosynthesis and peaking near dusk, then steadily declining during the hours of darkness.

There is also a seasonal DO cycle in which concentrations are greater in the colder, winter months and lower in the warmer, summer months. Streamflow (in freshwater) is generally lower during the summer and fall, and greatly affects flushing, reaeration, and the extent of saltwater intrusion, all of which affect dissolved oxygen values.

BIOCHEMICAL OXYGEN DEMAND

Five-day biochemical oxygen demand (BOD_5) is a measure of the amount of dissolved oxygen consumed by the decomposition of carbonaceous and nitrogenous matter in water over a five-day period.

The BOD test indicates the amount of biologically oxidizable carbon and nitrogen that is present in wastewater or in natural water. Matter containing carbon or nitrogen uses dissolved oxygen from the water as it decomposes, which can result in a dissolved oxygen decline. The quantity of BOD_5 discharged by point sources is limited through the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The discharge of BOD_5 from a point source is restricted by the permits so as to maintain the applicable dissolved oxygen standard.

pH

pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14 standard units (SU). A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic.

Low pH values are found in natural waters rich in dissolved organic matter, especially in Coastal Plain swamps and black water rivers. The tannic acid released from the decomposition of vegetation causes the tea coloration of the water and low pH.

High pH values in lakes during warmer months are associated with high phytoplankton (algae) densities. The relationship between phytoplankton and daily pH cycles is well established. Photosynthesis by phytoplankton consumes carbon dioxide during the day, which results in a rise in pH. In the dark, phytoplankton respiration releases carbon dioxide. In productive lakes, carbon dioxide decreases to very low levels, causing the pH to rise to 9-10 SU. Continuous flushing in streams prevents the development of significant phytoplankton populations and the resultant chemical changes in water quality.

Fecal Coliform Bacteria

Coliform bacteria are present in the digestive tract and feces of all warm-blooded animals, including humans, poultry, livestock, and wild animal species. Fecal coliform bacteria are themselves generally not harmful, but their presence indicates that surface waters may contain pathogenic microbes. Diseases that can be transmitted to humans through water contaminated by improperly treated human or animal waste are the primary concern. At present, it is difficult to distinguish between waters contaminated by animal waste and those contaminated by human waste.

Public health studies have established correlations between fecal coliform numbers in recreational and drinking waters and the risk of adverse health effects. Based on these relationships, the USEPA and SCDHEC have developed enforceable standards for surface waters to protect against adverse health effects from various recreational or drinking water uses. Proper waste disposal or sewage treatment prior to discharge to surface waters minimizes this type of pollution.

NUTRIENTS

Oxygen demanding materials and plant nutrients are common substances discharged to the environment by man's activities, through wastewater facilities and by agricultural, residential, and stormwater runoff. The most important plant nutrients, in terms of water quality, are phosphorus and nitrogen. In general, increasing nutrient concentrations are undesirable due to the potential for accelerated growth of aquatic plants, including algae. Nuisance plant growth can create imbalances in the aquatic

community, as well as aesthetic and access issues. High densities of phytoplankton (algae) can cause wide fluctuations in pH and dissolved oxygen. South Carolina has narrative standards for nutrients in water and the USEPA has issued recommendations for phosphorus concentrations to prevent over-enrichment.

The forms of nitrogen routinely analyzed at SCDHEC stations are ammonia and ammonium nitrogen (NH_3/NH_4), total Kjeldahl nitrogen (TKN), and nitrite and nitrate nitrogen (NO_2/NO_3). Ammonia and ammonium are readily used by plants. TKN is a measure of organic nitrogen and ammonia in a sample. Nitrate is the product of aerobic transformation of ammonia, and is the most common form used by aquatic plants. Nitrite is usually not present in significant amounts.

Total phosphorus (TP) is commonly measured to determine phosphorus concentrations in surface waters. TP includes all of the various forms of phosphorus (organic, inorganic, dissolved, and particulate) present in a sample.

TURBIDITY

Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. It is an important consideration for drinking water as finished water has turbidity limits. State water quality standards address turbidity in waters classified for Trout.

TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) are the suspended organic and inorganic particulate matter in water. Although increasing TSS can also be an indication of increased runoff from land, TSS differs from turbidity in that it is a measure of the mass of material in, rather than light transmittance through, a water sample. High TSS can adversely impact fish and fish food populations and damage invertebrate populations. There are no explicit State standards for TSS.

HEAVY METALS

Concentrations of cadmium, chromium, copper, lead, mercury, and nickel in water are routinely measured by the Department to compare to State standards intended to protect aquatic life and human health. These metals occur naturally in the environment, and many are essential trace elements for plants and animals. Human activities, such as land use changes and industrial and agricultural processes, have resulted in an increased flux of metals from land to water. Atmospheric inputs are recognized as important sources of metals to aquatic systems. Metals are released to the atmosphere from the burning of fossil fuels (coal, oil, gasoline), wastes (medical, industrial, municipal), and organic materials. The metals are then deposited on land and in waterways from the atmosphere via rainfall and attached to particulates (dry deposition).

Assessment Methodology

The Watershed Water Quality Assessment is a geographically-based document that describes, at the watershed level, water quality as well as conditions and activities related to water quality. This section provides an explanation of the information assessment methodology used to generate the watershed-level summaries. Water quality data summaries used in this assessment are presented in Appendix A.

USE SUPPORT DETERMINATION

At the majority of SCDHEC's surface water monitoring stations, samples for analysis are collected as surface grabs once per month, quarter, or year, depending on the parameter. Grab samples collected at a depth of 0.3 meters are considered surface measurements, and are used to establish representative physical conditions and chemical concentrations in the waterbodies sampled. At most stations sampled by boat, dissolved oxygen and temperature are sampled as a water column profile, with measurements being made at a depth of 0.3 meters below the water surface and at one-meter intervals to the bottom. At stations sampled from bridges, these parameters are measured only at a depth of 0.3 meters. All water and sediment samples are collected and analyzed according to standard procedures. Macroinvertebrate community structure is analyzed routinely at selected stations as a means of detecting adverse biological impacts on the aquatic fauna due to water quality conditions which may not be readily detectable in the water column chemistry.

For the purpose of assessment, only results from surface samples are used in water quality standards comparisons and trend assessments. This information is considered to represent "average" conditions, as opposed to extremes, because of the inability to target individual high or low flow events on a statewide basis. Results from water quality samples can be compared to State standards and USEPA criteria, with some restrictions due to time of collection and sampling frequency. The monthly sampling frequency employed in the ambient monitoring network may be insufficient for strict interpretation of standards. The USEPA does not define the sampling method or frequency other than indicating that it should be "representative." A grab sample is considered to be representative for indicating excursions relative to standards: a single grab sample is more representative of a one-hour average than a four-day average, more representative of a one-day average than a one-month average, and so on (see also Screening & Additional Considerations for Water Column Metals below). When the sampling method or frequency does not agree with the intent of the particular standard, conclusions about water quality should be considered as only an indication of conditions.

The time period used to assess standards compliance is the most recent complete five years of data, which for the Catawba River Basin is 1994 through 1998.

AQUATIC LIFE USE SUPPORT

One important goal of the Clean Water Act and State standards is to maintain the quality of surface waters in order to provide for the survival and propagation of a balanced indigenous aquatic community of fauna and flora. The degree to which aquatic life is protected (aquatic life use support) is assessed by

comparing important water quality characteristics and the concentrations of potentially toxic pollutants with standards. Aquatic life use support is based on the percentage of standards excursions at a sampling site, and where data are available, the composition and functional integrity of the biological community. For lakes, support of aquatic life uses is also evaluated using a measure of trophic state. A number of waterbodies have been given specific standards for pH and dissolved oxygen, which reflect natural conditions.

For assessment purposes, a dissolved oxygen (DO) standard of not less than 4 mg/l is used for Class SB, a standard of not less than 6 mg/l is used for TN and TPGT, and a daily average not less than 5 mg/l with a low of 4 mg/l is used for all other Classes. The term excursion is used to describe a DO concentration measurement of less than the stated standard. Dissolved oxygen and pH may vary from the ranges specified in the standards due to a variety of natural causes.

For pH, there are several acceptable ranges applied depending on the Class of water: 6-8 SU for TPGT; 6-8.5 SU for FW; 5-8.5 SU for FW*; and 6.5-8.5 for SFH, SA, and SB. For DO and pH, if 10 percent or less of the samples contravene the appropriate standard, then aquatic life uses are said to be fully supported. A percentage of standards excursions between 11-25 is considered partial support, and a percentage greater than 25 is considered to represent nonsupport, unless excursions are due to natural conditions.

When comparing sampling data to DO standards, it is necessary to consider sampling bias due to season or tide stage. Samples are collected as a single instantaneous grab sample, which is not truly representative of the daily average used as the criterion for most classifications. Secondary stations are sampled only during summer months and generally experience a higher percentage of DO excursions as a result. It is essential to examine the data to ascertain such patterns of excursions before summarily concluding that the indicated violations constitute poor water quality.

For any individual toxicant (heavy metals, priority pollutants, chlorine, ammonia), if the acute aquatic life standard is exceeded in more than 10 percent of the samples, based on at least ten samples, aquatic life uses are not supported. If the acute aquatic life standard is exceeded more than once, but in less than or equal to 10 percent of the samples, uses are partially supported. If fewer than ten samples were collected, discretion must be used and other factors considered, such as the magnitude of the excursions or number of toxicants with excursions. In such a circumstance, the site is prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation. Biological data are the ultimate deciding factor for determining support of aquatic life uses, regardless of chemical conditions.

MACROINVERTEBRATE DATA INTERPRETATION

Macroinvertebrate community assessments are used, where available, to supplement or verify Aquatic Life Use Support determinations and to evaluate potential impacts from the presence of sediment contaminants. Aquatic and semi-aquatic macroinvertebrates are identified to the lowest practical taxonomic level depending on the condition and maturity of specimens collected. The EPT Index and the North Carolina Biotic Index are the main indices used in analyzing macroinvertebrate data. To a lesser extent,

taxa richness and total abundance may be used to help interpret data.

The EPT Index or the Ephemeroptera (mayflies) - Plecoptera (stoneflies) - Trichoptera (caddisflies) Index is the total taxa richness of these three generally pollution-sensitive orders. EPT values are compared with least impacted regional sites. The Biotic Index for a sample is the average pollution tolerance of all organisms collected, based on assigned taxonomic tolerance values. A database is currently being developed to establish significant EPT index levels to be used in conjunction with the Biotic Index to address aquatic life use support.

Taxa richness is the number of distinct taxa collected and is the simplest measure of diversity. High taxa richness is generally associated with high water quality. Increasing levels of pollution progressively eliminate the more sensitive taxa, resulting in lower taxa richness. Total abundance is the enumeration of all macroinvertebrates collected at a sampling location. This is generally not regarded as a qualitative metric. However, when gross differences in abundance occur between stations this metric may be considered as a potential indicator.

RECREATIONAL USE SUPPORT

The degree to which the swimmable goal of the Clean Water Act is attained (recreational use support) is based on the frequency of fecal coliform bacteria excursions, defined as greater than 400/100 ml for all surface water classes. Comparisons to the bacteria geometric mean standard are not considered appropriate based on sampling frequency and the intent of the standard. If 10 percent or less of the samples are greater than 400/100 ml then recreational uses are said to be fully supported. A percentage of standards excursions between 11-25% is considered partial support of recreational uses, and greater than 25% is considered to represent nonsupport of recreational uses.

FISH CONSUMPTION USE SUPPORT

The Department uses a risk-based approach to evaluate contaminant concentrations in fish tissue and to issue consumption advisories in affected waterbodies. This approach contrasts the average daily exposure dose to the reference dose (RfD). Using these relationships, fish tissue data are interpreted by determining the consumption rates that would not be likely to pose a human health threat.

Fish consumption use support is determined by the occurrence of advisories on consumption for a waterbody. For the support of fish consumption uses, a fish consumption advisory which limits consumption for the general population or a subpopulation at greater risk (e.g. pregnant women, children) indicates partial use support. A “do not eat any” consumption advisory for one or more species for the general population or subpopulation at greater risk indicates nonsupport of uses.

For background information and the most current advisories please visit the Bureau of Water homepage at http://www.state.sc.us/dhec/eqc/water/ and click on "Advisories" under the Water Subject Index, or go directly to http://www.state.sc.us/dhec/eqc/admin/html/fishadv.html. For more information or

a hard copy of the advisories, call SCDHEC's Division of Health Hazard Evaluation toll-free at (888) 849-7241.

HUMAN HEALTH STANDARDS

State standards for human health are also evaluated in the preparation of the Watershed Water Quality Assessment. For contaminants with human health standards (e.g. heavy metals, pesticides), a potential human health threat is indicated if the median concentration exceeds the standard.

Additional Screening and Prioritization Tools

Evaluation of water quality data and other supplemental information facilitates watershed planning. Information from the following sources is used to develop watershed-based protection and prevention strategies.

LONG-TERM TREND ASSESSMENT

As part of the watershed water quality assessments, surface data from each station are analyzed for statistically significant long-term trends using a modification of Kendall's tau, which is a nonparametric test removing seasonal effects. Flows are not available for most stations, and the parametric concentrations are not flow-corrected. Seasonal Kendall's tau analysis is used to test for the presence of a statistically significant trend of a parameter, either increasing or decreasing, over a fifteen year period. It indicates whether the concentration of a given parameter is exhibiting consistent change in one direction over the specified time period. A two sided test at $p = 0.1$ is used to determine statistically significant trends, and the direction of trend. An estimate of the magnitude of any statistically significant trend is calculated.

A rigorous evaluation for trends in time-series data usually includes a test for autocorrelation. The data are not tested for autocorrelation prior to the trend analysis. It is felt that autocorrelation would not seriously compromise a general characterization of water quality trends based on such a long series of deseasonalized monthly samples.

One of the advantages of the seasonal Kendall test is that values reported as being below detection limits (DL) are valid data points in this nonparametric procedure, since they are all considered to be tied at the DL value. When the DL changed during the period of interest, all values are considered to be tied at the highest DL occurring during that period. Since it is possible to measure concentrations equal to the value of the DL, values less than DL are reduced by subtraction of a constant so that they remain tied with each other, but are less than the values equal to the DL. Since fecal coliform bacteria detection limits vary with sample dilution, there is no set DL; therefore, for values reported as less than some number, the value of the number is used.

SEDIMENT SCREENING

There are no sediment standards; therefore, to identify sediments with elevated metals concentrations, percentiles are constructed using five years of statewide sediment data. Only values greater than the detection limit were used for chromium, copper, nickel, lead, and zinc. Because so few concentrations of cadmium and mercury are measured above the detection limit, all samples were pooled for these metals. A sediment metal concentration is considered to be high if it is in the top 10% of the pooled results, and very high if it is in the top 5%. Any analytical result above detection limits is flagged for pesticides, PCBs, and other priority pollutants. Sites with noted high metals concentrations or the occurrence of other contaminants above detection limits are prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation.

WATER COLUMN METALS ANALYSES

The USEPA criteria for heavy metals to protect aquatic life are specified as a four-day average and a one-hour average, and have been adopted as State standards. Because of the quarterly sampling frequency for heavy metals, comparisons to chronic toxicity standards (four-day average concentration) are not considered appropriate; therefore, only the acute standard (one-hour average) for the protection of aquatic life is used in the water quality assessment (Table 1).

Zinc and copper are elevated in surface waters statewide and concentrations are frequently measured in excess of the calculated acute aquatic life standards. To identify areas where zinc, copper, and other metals are elevated in the water column above normal background concentrations, concentrations greater than the detection limit from all SCDHEC monitoring sites statewide for a five year period are pooled and the 90th and 95th percentiles are computed. This is done separately for each metal for both fresh and saltwaters. The individual measurements from each monitoring station are then compared to these percentiles, as well as to State standards. As in sediments, a metal concentration is referred to as "high" if it is in the top 10% of the pooled results, and "very high" if it is in the top 5%. All water column values referred to as "high" or "very high" are also in excess of the acute aquatic life standard listed in Table 1. For chromium, because so few concentrations are above the detection limit, all samples collected are used to generate the percentiles. Sites with high metals concentrations are prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation.

Table 1. Metal Standards in Water (µg/l)				
Metal	Present Detection Level	Freshwater 1Hr. Acute Ave.	Saltwater 1Hr. Acute Ave.	Human Health
*Cadmium	10.0	1.79	43.0	5.00
Chromium (VI)	10.0	16.00	1100.0	100.00
*Copper	10.0	9.22	2.9	
*Lead	50.0	33.78	140.0	
Mercury	0.2	2.40	2.1	0.15
*Nickel	20.0	789.00	75.0	100.00
*Zinc	10.0	65.00	95.0	5000.00
* Freshwater standards based on a hardness of 50 mg/l as $CaCO_3$.				

The analytical procedures used by the Department yield total metal concentration, which is a relatively conservative measure, since the total metal concentration is always greater than the acid-soluble or dissolved fraction. Most heavy metal criteria for freshwater are calculated from formulas using water hardness. The formulas used to calculate criteria values are constructed to apply to the entire United States, including Alaska and Hawaii. As with all the USEPA criteria, there is also a large margin of safety built into the calculations. The applicability of the hardness-based criteria derived from the USEPA formulas to South Carolina waters has been a subject of much discussion. Hardness values vary greatly nationwide (from zero into the hundreds), with South Carolina representing the lower end of the range (statewide average value is approximately 20 mg/l). Representatives of the USEPA Region IV standards group have stated that no toxicity data for hardness values less than 50 mg/l were used in the development of the formulas. They have expressed reservations about the validity of the formulas when applied to hardness values below 50 mg/l. Based on this opinion, South Carolina's State standards for metals are based on a hardness of 50 mg/l for waters where hardness is 50 mg/l or less, resulting in several criteria values below the Department's current analytical detection limits. Therefore, any detectable concentration of cadmium, copper, or lead is an excursion beyond recommended criteria.

The SCDHEC monitoring data have historically indicated that zinc and copper levels in South Carolina waters are elevated relative to USEPA criteria, apparently a statewide phenomenon in both fresh and salt waters, and possibly resulting from natural conditions, nonpoint sources, or airborne deposition. These levels do not appear to adversely affect state fisheries or macroinvertebrate communities, which suggests that the levels are the result of long-term local conditions to which the fauna have adapted, as opposed to point

source pollution events. It is difficult to assess the significance of heavy metal excursions due to the questionable applicability of the formulas at low hardness values and calculated criteria below present detection limits.

NPDES Program

The Water Facilities Permitting Division and the Industrial, Agricultural, and Stormwater Permitting Division are responsible for drafting and issuing National Pollutant Discharge Elimination System (NPDES) permits. Facilities are defined as either "major" or "minor". For municipal permits, a facility is considered a "major" if it has a permitted flow of 1 MGD or more and is not a private facility. The determination for industrial facilities is based on facility and stream characteristics, including toxicity, amount of flow, load of oxygen, proximity of drinking water source, potential to exceed stream standards, and potential effect on coastal waters.

Permitting Process

A completed draft permit is sent to the permittee, the SCDHEC District office, and if it is a major permit, to the USEPA for review. A public notice is issued when the permit draft is finalized. Comments from the public are considered and, if justified, a public hearing may be arranged. Both oral and written comments are collected at the hearing, and after considering all information, the Department staff make the decision whether to issue the permit as drafted, issue a modified permit, or to deny the permit. Everyone who participated in the process receives a notice of the final decision. A copy of the final permit will be sent to anyone who requests it. Staff decisions may be appealed according to the procedures in R.61-72.

The permitting Divisions use general permits with statewide coverage for certain categories of NPDES permits. Discharges covered under general permits include utility water, potable surface water treatment plants, potable groundwater treatment plants with iron removal, petroleum contaminated groundwater, and mine dewatering activities. Additional activities proposed for general permits include bulk oil terminals, aquacultural facilities, and ready-mix concrete/concrete products. Land application systems for land disposal and lagoons are also permitted.

Wasteload Allocation Process

A wasteload allocation (WLA) is the portion of a stream's assimilative capacity for a particular pollutant which is allocated to an existing or proposed point source discharge. Existing WLAs are updated during the basin review process and included in permits during the normal permit expiration and reissuance process. New WLAs are developed for proposed projects seeking a discharge permit or for existing discharges proposing to increase their effluent loading at the time of application. Wasteload allocations for oxygen demanding parameters are developed by the Water Quality Modeling Section, and WLAs for toxic pollutants and metals are developed by the appropriate permitting division.

The ability of a stream to assimilate a particular pollutant is directly related to its physical and chemical characteristics. Various techniques are used to estimate this capacity. Simple mass balance/dilution calculations may be used for a particular conservative (nondecaying) pollutant while complex models may be used to determine the fate of nonconservative pollutants that degrade in the environment. Waste characteristics, available dilution, and the number of discharges in an area may, along with existing water quality, dictate the use of a simple or complex method of analysis. Projects which generally do not require complex modeling include: groundwater remediation, noncontact cooling water, mine dewatering, air washers, and filter backwash.

Streams are designated either effluent limited or water quality limited based on the level of treatment required of the dischargers to that particular portion of the stream. In cases where the USEPA published effluent guidelines and the minimum treatment levels required by law are sufficient to maintain instream water quality standards, the stream is said to be effluent limited. Streams lacking the assimilative capacity for a discharge at minimum treatment levels are said to be water quality limited. In cases where better than technology limits are required, water quality, not minimum requirements, controls the permit limits. The Department's Water Quality Modelling Section recommends limits for numerous parameters including ammonia nitrogen (NH3-N), dissolved oxygen (DO), total residual chlorine (TRC), and five-day biochemical oxygen demand (BOD5). Limits for other parameters, including metals, toxics, and nutrients are developed by the Water Facilities Permitting Division or the Industrial, Agricultural, and Stormwater Permitting Division in conjunction with support groups within the Department.

Nonpoint Source (NPS) Management Program

NPS water pollution, sometimes called “runoff pollution” or “polluted runoff” does not result from a discharge at a specific, single location (or point), but generally comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria containing waste from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest waterbody or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries, and wetlands. NPS pollution may also impact groundwater when it is allowed to seep or percolate into aquifers. Adverse effects of NPS pollution include physical destruction of aquatic habitat, fish kills, interference with or elimination of recreational uses of a waterbody (particularly lakes), closure of shellfish beds, reduced water supply or taste and odor problems in drinking water, and increased potential for flooding because waterbodies become choked with sediment.

Congress recognized the growing problem of nonpoint source pollution in the late 1980s, and added NPS provisions to the federal law. Section 319 of the 1987 Amendments to the Clean Water Act required states to assess the nonpoint source water pollution associated with surface and groundwater within their borders and then develop and implement a management strategy to control and abate the pollution. The first

Assessment of Nonpoint Source Pollution in South Carolina accomplished this purpose. The Department's Bureau of Water manages the ongoing State NPS Management Program, which develops strategies and targets waterbodies for priority implementation of management projects. Section 319 funds various voluntary efforts, including watershed projects, which address many aspects of the pollution prevention management measure and provide education, outreach and technical assistance to various groups and agencies. Most of the projects are implemented by cooperating agencies.

Section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (CZARA) requires states with federally approved Coastal Zone Management Programs to develop Coastal Nonpoint Source Pollution Control Programs. At the federal level, the program is administered and funded jointly by the National Oceanic and Atmospheric Administration (NOAA) and EPA. In South Carolina, the Department's Office of Ocean and Coastal Resource Management and the Bureau of Water are responsible for development and implementation of the program.

Many land activities can individually or cumulatively contribute to NPS pollution. Eight categories of NPS pollution sources have been identified as contributing to water quality degradation in South Carolina: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands and riparian areas disturbance, land disposal, and groundwater contamination. There are programs, both regulatory and voluntary, in-place that address all eight categories.

Agriculture

In South Carolina, pesticides, fertilizers, animal waste, and sediment are potential sources of agricultural NPS pollution. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment, and through the management of water. The State has laws and regulations that prevent NPS pollution from several agricultural sources including pesticides and animal waste. Funding programs including those under section 319 grants from EPA, cost share funds from USDA under EQIP and CRP are used to implement best management practices that are not covered under regulations. Agriculture land acreage is quantified in the basin-wide and individual watershed evaluations.

Silviculture

Forests comprise a major portion of South Carolina's land base. Sixty-six percent, or 12.6 million acres, of the State's total land area is in timberland. Silvicultural practices associated with road access, harvest, and regeneration of timber present the most significant potential for NPS pollution. Silvicultural activities have the potential to degrade the State's waters through the addition of sediment, nutrients, organics, elevated temperature, and pesticides. Erosion and subsequent sedimentation are the most significant and widespread NPS problems associated with forestry practices. Sudden removal of large quantities of vegetation through harvesting or silvicultural practices can also increase leaching of nutrients from the soil system into surface waters and groundwaters. Programs to abate or control NPS pollution from forestry activities are primarily the responsibility of the S.C. Forestry Commission (SCFC) and the United States Department of Agriculture's Forest Service (USFS), with other agencies having supplementary programs. The United States Department of Agriculture's Natural Resources Conservation Service (USDA-NRCS) also provides technical assistance to government, landowners, and land users. Forest land acreage is quantified in the basin-wide and individual watershed evaluations.

Urban Areas

Urbanization has been linked to the degradation of urban waterways. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses. Suspended sediments constitute the largest mass of pollutant loadings to receiving waters from urban areas. Construction sites are a major source of sediment erosion. Nutrient and bacterial sources of contamination include fertilizer usage, pet wastes, leaves, grass clippings, and faulty septic tanks. Petroleum hydrocarbons result mostly from automobile sources. In the 1980's, the average statewide population growth was 11.7 percent, while the coastal counties had an increase of 22 percent, nearly double the State rate during the same time period. This continuing development and population growth has the potential to make urban runoff the most significant source of pollution in waters of the State in the future. Urban land acreage is quantified in the basin-wide and individual watershed evaluations.

SCDHEC has a number of statewide programs that address components of urban NPS pollution. The Bureau of Water (BOW) administers four permitting programs which control runoff from new and existing urban sources. These include the Stormwater and Sediment Reduction program, Municipal Separate Storm Sewer System (MS4), Industrial NPDES Stormwater Permits, and the Section 401 water quality certification program (see p.25). Additional controls for urban runoff in the coastal zone are implemented by SCDHEC Oceans and Coastal Resources Management (OCRM) through the State Coastal Zone Management Plan.

The Bureau of Environmental Health's Division of Onsite Wastewater Management administers the Onsite Sewage Disposal System program for the entire State, and oversees the permitting for the installation and management of septic systems. Although not associated with urban land use, camping facilities are

permitted by this Division because of their sewage disposal systems. The types of camping facilities permitted by the Department through R.61-39 are Resident Camps and Family Camps. Resident camps are organized camps where one or more buildings are provided for sleeping quarters. These camps are typically operated for educational, recreational, religious, or health purposes. Family camps are organized camps where camp sites are provided for use by the general public or certain groups. The camp sewage is discharged into a public collection, treatment and disposal system if available, or an onsite wastewater treatment and disposal system (septic tank) is used. Camp locations are identified in the appropriate watershed evaluations.

Marinas and Recreational Boating

Potential adverse environmental impacts associated with marinas include dissolved oxygen deficiencies and high concentrations of toxic metals in aquatic organisms. In addition, marina construction activities can lead to the physical destruction of sensitive ecosystems and bottom-dwelling aquatic communities. Presently, there are more than 100 marinas in South Carolina, with 68 of them in the coastal zone. The U.S. Army Corps of Engineers and the SCDHEC are responsible for permitting marinas in South Carolina. Within SCDHEC, the two offices which have marina permitting authority are the Office of Ocean and Coastal Resource Management (SCDHEC OCRM) and the Office of Environmental Quality Control (SCDHEC Bureau of Water). SCDHEC OCRM issues critical area permits for marinas within the critical area of the coastal zone. SCDHEC Bureau of Water issues permits for marinas at all other locations within the State and issues Section 401 Water Quality Certifications (see p.25) for marinas statewide. The U.S. Coast Guard and the S.C. Department of Natural Resources (SCDNR) are responsible for managing recreational boating activity.

Mining

South Carolina's mineral production consists of non-fuel minerals that provide raw materials for construction products and a precious metal industry. Portland cement clays (kaolin and brick), sand and gravel, and crushed stone represent the majority of the total mineral value. At the end of FY 1997-1998, there were 495 mining operations in South Carolina affecting more than 19,000 acres. Surface mining has the potential to generate NPS pollution during mineral exploration, mine development extraction, transportation, mining and processing, product storage, waste disposal, or reclamation. Potential nonpoint source impacts related to mining activities generally include hydrologic modification, erosion and sedimentation, water quality deterioration, fish and wildlife disturbances, and public nuisances.

The Department’s Bureau of Land and Waste Management has primary regulatory responsibility for mining activities. Within the Bureau, the Division of Mining and Solid Waste Permitting is responsible for administering and implementing the S.C. Mining Act and its associated regulations. The Mining Act serves

as part of an overall management plan for NPS pollution from active mines. Mining activities and locations are identified in the appropriate watershed evaluations.

Hydromodification

Hydrologic modification (or hydromodification) is defined as stream channelization, channel modification, and dam construction. These activities can negatively impact water quality, destroy or modify in-stream habitat and increase streambank and shoreline erosion. Two State permits, implemented by the SCDHEC, are involved in the implementation of management measures for hydromodification. A critical area permit is required for coastal waters, saltwater wetlands, and beaches defined as critical areas. A navigable waters permit is required for the remainder of the State. Implementation of State policy for dam construction is similar to control of other hydromodification projects in South Carolina, requiring the same State permits and certifications. In addition, dams may require a State dam safety permit or a State stormwater management and sediment reduction permit.

Wetlands

Twenty-three percent of South Carolina is covered by 4.5 million acres of wetlands. The U.S. Army Corps of Engineers implements the federal program for regulating development in wetlands with guidelines established by EPA. The Corps delineates wetlands and determines which wetlands fall under regulatory jurisdiction and require a federal permit for development. The Wetlands Reserve Program, administered by the NRCS, is designed to restore and protect wetlands. At the state level, the primary focus of wetland regulation is the §401 Water Quality Certification. In the §401 certification process, applications for wetland alterations may be denied or modified due to the special nature of a wetland or the functions that a wetland provides. Wetland impacts must be compensated through restoration, enhancement, preservation, or creation and protected in perpetuity. Future development would be prohibited in these legally protected areas. Knowledge of areas that are restricted from development due to mitigation or special water classification is useful in planning future development in a watershed. Wetland acreage is quantified in the basin-wide and individual watershed evaluations.

Land Disposal

Although modern solid waste disposal sites are considered point sources of pollution and regulated, leachate from sanitary landfills and dumps has the potential to pollute large portions of adjacent groundwater. Toxic compounds are commonly a part of the overall composition of landfill leachate, especially when the landfill has been used for the disposal of toxic chemicals. There are currently 140 permitted landfills in South Carolina. This total represents 35 municipal solid waste landfills (MSWLF), 62 industrial waste landfills, 41 construction and demolition (C&D) landfills, one sludge monofill, and one ash monofill. Regulatory authority over solid waste disposal activities resides with the South Carolina Department of Health and Environmental Control (SCDHEC), Bureau of Land and Waste Management.

All active and closed industrial and municipal solid waste landfills are identified in the appropriate watershed evaluations.

Land application is a form of recycling because it allows recovery of elements needed for crop production. Land application of biosolids may be beneficial and environmentally sound when applied at the correct agronomic rate. Land applying biosolids can benefit farmers by offsetting the costs of fertilizer and lime while reducing the pressure on existing landfills. SCDHEC's Bureau of Water, Division of Water Monitoring, Assessment and Protection, Groundwater Quality Section conducts a program to prevent, monitor, and correct groundwater contamination from nonpoint source pollution from land application of wastewater biosolids, solids, animal manures, biosolids, and sewage sludge. All active industrial and municipal land applications are identified in the appropriate watershed evaluations.

Groundwater Contamination

All aquifers in the State are potential Underground Sources of Drinking Water and are protected under the S.C. Water Classifications and Standards. Groundwaters are thus protected in a manner consistent with the SCDHEC groundwater protection strategy. Staff hydrogeologists implement a screening program for nonpoint source impacts from pits, ponds, and lagoons associated with the permitted storage, treatment, and disposal of industrial and municipal waste waters. In cases where groundwater impact has been identified in violation of S.C. Water Classifications and Standards, appropriate actions will be coordinated with the facility owner to ensure regulatory compliance. The hydrogeologist coordinates with the facility owner to implement source identification, contaminant extent assessments, initiation of contaminant remediation systems and performance evaluations of corrective actions. In addition to releases from wastewater treatment systems, the staff evaluates releases from other nonpoint sources such as above ground tanks, non- regulated fuel oil tanks, spills and/or leaks. Sites with confirmed groundwater impact will be placed under a Consent Agreement or an Order. For the purposes of this assessment, only groundwater contamination affecting surface waters will be identified in the individual watershed evaluations. The SCDHEC groundwater contamination inventory was used to identify groundwater-related problem areas in the basin. Sites in the inventory are referenced by name and county, and are updated annually.

Water Supply

Water treatment facilities are permitted by the Department for municipal and industrial potable water production. As per the 1983 Water Use Reporting and Coordination Act (Act 282), all water uses over 100,000 gallons per day must report their usage. This includes industrial, agricultural, mining, golf courses, public supply, commercial, recreational, hydro power, thermo power, and nuclear power activities. Intake location and the volume removed from a stream are identified in the watershed evaluations for both municipal (potable) and industrial uses.

Growth Potential and Planning

Land use and management can define the impacts to water quality in relation to point and nonpoint sources. Assessing the potential for an area to expand and grow allows for water quality planning to occur and, if appropriate, increased monitoring for potential impairment of water quality. Indicators used to predict growth potential include water and sewer service, road and highway accessibility, and population trends. These indicators and others were used as tools to determine areas within the Catawba River Basin having the greatest potential for impacts to water quality as a result of development.

Many counties in the Catawba River Basin lack county wide zoning ordinances; therefore, there is little local regulatory power to influence the direction or magnitude of regional growth. The majority of municipalities have zoning ordinances in place; however, much of the growth takes place just outside the municipal boundaries, where infrastructure is inadequate. Section 208 of the Clean Water Act serves to encourage and facilitate the development and implementation of areawide waste treatment management plans. The §208 Areawide Water Quality Management Plans were completed in great detail during the 1970's and have recently been updated. Information from the updated reports are used in the individual watershed evaluations.

Watershed boundaries extend along topographic ridges and drain surrounding surface waters. Roads are commonly built along ridge tops with the best drainage conditions. Cities often develop in proximity to ridges as a result of their plateau terrain. It is not uncommon, then, to find cities or road corridors located along watershed boundaries, and thus influencing or impacting several watersheds.

Watershed Protection and Restoration Strategies

SCDHEC's Bureau of Water is responsible for ensuring that South Carolina's water is safe for drinking and recreation, and suitable to support aquatic life. This section provides an overview of other important Bureau programs and strategies applied statewide to protect and restore water quality. The point and nonpoint source controls described previously assist with achieving these goals.

Under section 303(d) of the Federal Clean Water Act, each state is required to provide a comprehensive inventory of impaired waters for which existing required pollution controls are not stringent enough to achieve State water quality standards or Federal Clean Water Act goals. This biennial list, commonly referred to as the "303(d) list" is the basis for targeting waterbodies for watershed-based solutions. A copy of the current 303(d) list can be obtained by contacting the Bureau of Water. Several Bureau programs address these impaired streams in an effort to restore them.

Total Maximum Daily Load

A Total Maximum Daily Load (TMDL) is the calculated maximum allowable pollutant loading to a waterbody at which water quality standards are maintained. A TMDL is made up of two main components, a load allocation and a wasteload allocation. A load allocation is the portion of the receiving water's loading capacity attributed to existing or future nonpoint sources or to natural background sources. The waste load allocation is the portion of a receiving water's loading capacity allocated to an existing or future point source.

A TMDL is a means for recommending controls needed to meet water quality standards in a particular water or watershed. Historically, the typical TMDL has been developed as a wasteload allocation, considering a particular waterbody segment, for a particular point source, to support setting effluent limitations. In order to address the combined cumulative impacts of all sources, broad watershed-based TMDLs are now being developed.

The TMDL process is linked to all other State water quality activities. Water quality impairments are identified through monitoring and assessment. Watershed-based investigations result in source identification and TMDL development. TMDLs form links between water quality standards and point and nonpoint source controls. Where TMDLs are established, they constitute the basis for NPDES permits and for strategies to reduce nonpoint source pollution. The effectiveness and adequacy of applied controls are evaluated through continued monitoring and assessment.

Antidegradation Implementation

The State's Antidegradation Policy as part of S.C. Regulation 61-68 is represented by a three-tiered approach to maintaining and protecting various levels of water quality and uses; streams included on the 303(d) list are addressed under Tier 1. Tier 1 antidegradation policies apply to all waters of the State and

require that existing uses and the minimum level of water quality for those uses be maintained and protected. Tier 2 policies apply to high water quality where the water quality exceeds the mandatory minimum levels to support the Clean Water Act's goals of propagation of fish, shellfish, wildlife, and recreation in and on the water. The Department considers all the waters of the State as high quality waters. Tier 3 policies apply to the maintenance of water quality in waters which constitute an Outstanding National Resource Water and do not allow for any permanent permitted dischargers. Outstanding Resource Waters of the State are provided a higher level of protection than Tier 2, but do not meet the requirements of Tier 3.

The antidegradation rules will be implemented for Tier 1 protection when applying narrative standards included in Regulation 61-68 as follows: if nutrient loadings caused a waterbody to be included on the 303(d) list, then the Department will not allow a permitted net increase of loading for the appropriate nutrient(s) until such time as a TMDL is developed for the waterbody. In addition, Tier 1 protection will be implemented when applying numeric standards included in Regulation 61-68 for human health, aquatic life, and organoleptic protection as follows: if a waterbody has been affected by a parameter of concern causing it to be on the 303(d) list, then the Department will not allow a permitted net increase of loading for the parameter of concern unless the concentration will not contribute to a violation of water quality standards. Maintenance of current levels will be achieved by reallocation of existing total loads or by meeting applicable water quality standards at the end-of-pipe. No discharge will be allowed to cause or contribute to further degredation of a 303(d) listed waterbody. This no net increase will be achieved by reallocation of existing total load(s) or by meeting applicable water quality standard(s) at the end-of-pipe.

The Antidegradation Rules apply to both nonpoint source pollution and for point sources into impaired waters. Many activities contributing to nonpoint source pollution are controlled with voluntary measures. The Department implements permitting or certification programs for some of these activities and has the opportunity to ensure compliance with the Antidegradation Rules. The activities of primary concern are land development projects which are immediately adjacent to and discharge runoff or stormwater into impaired waters.

401 Water Quality Certification Program

If a Federal permit for a discharge into waters of the State, including wetlands, is required, the Department must issue Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act. Certification is required for permits issued by the U.S. Army Corps of Engineers for construction in navigable waters and for deposition of dredged or fill material.

Regulation 61-101 presents administrative and technical guidance for the water quality certification program and requires DHEC to consider whether or not a project is water dependent; whether or not there are feasible alternatives which will have less adverse consequences on water quality and classified uses; the intended purpose of the project; and all potential water quality impacts of the project, both direct and

indirect, over the life of the project. Any project with the potential to affect waters of the State must be conducted in such a manner to maintain the specified standards and classified and existing water uses.

As a routine part of the 401 Water Quality Certification review process, the waterbody in question is identified as impaired or not impaired according to the 303(d) list. If it is impaired, the parameter of concern is noted, along with any steps required to prevent further degradation of the water quality of that waterbody. In an effort to facilitate watershed restoration where appropriate, mitigation for unavoidable wetland impacts is encouraged in areas that improve 303(d) listed waters.

South Carolina Animal Feeding Operations Strategy

Among the general categories of pollution sources, agriculture ranks as the number one cause of stream and lake impairment nationwide. Many diseases can potentially be contracted from drinking water or coming into contact with waters contaminated with animal wastes. The Department uses SC Regulation 61-43: *Standards for the Permitting of Agricultural Animal Facilities* to address the permitting of animal feeding operations (AFOs). Implementing these regulations and their corresponding compliance efforts are a priority for the Department in order to reduce public health and environmental impacts from AFOs. There are currently no concentrated animal feeding operations (CAFOs) in operation in South Carolina, and approximately 2,000 AFOs. Using the Watershed Program cycle and the division of the State into five regions, AFOs will be monitored and inspected by region. The 303(d) list will be used to prioritize the inspections. After all the inspections have been made in a region, the Department will move to the next basin in the watershed cycle. The Department is continuing to work in cooperation and coordination with the US Department of Agriculture, the Natural Resources Conservation Service, the South Carolina Department of Agriculture, the South Carolina Soil and Water Conservation Districts, and the Clemson Extension Service.

Stormwater Program

Stormwater discharges result from precipitation during rain events. Runoff washes pollutants associated with industrial activities (including construction activity), agricultural operations, and commercial and household sites directly into streams, or indirectly into drainage systems that eventually drain into streams. The SCDHEC Stormwater Permitting Program focuses on pollution prevention to reduce or eliminate stormwater pollution. The Department has general permitting authority for stormwater discharges associated with industrial activity, including construction. General permits SCR000000 and SCR100000 for industrial and construction activities, respectively, require permittees to develop and implement stormwater pollution prevention plans that establish best management practices to effectively reduce or eliminate the discharge of pollutants via stormwater runoff. The Stormwater and Agricultural Permitting Section is responsible for issuing NPDES stormwater permits to prevent degradation of water quality as well as for

issuing sediment and erosion control permits for construction sites. SCDHEC's Office of Ocean and Coastal Resource Management manages the State sediment and erosion control in the coastal area.

Regulation 61-9 requires a compilation of all existing State water quality data with STORET data being used as a baseline. If analysis indicates a decrease in water quality then corrective measures must be taken. The permittee will identify all impaired water bodies in a Stormwater Management Plan (SWMP). In addition, existing pollution discharge control methods will be identified and incorporated into the SWMP. Procedures, processes, and methods to control the discharge of pollutants from the municipal separate storm sewer system (MS4) into impaired waterbodies and publicly owned lakes included on the 303(d) list will be described in the SWMP. The effectiveness of these controls will be assessed and necessary corrective measures, if any, shall be developed and implemented.

Sanitary Sewer Overflow Strategy

Sanitary sewers are designed to collect municipal and industrial wastewater, with the allowance for some acceptable level of infiltration and infow, and transport these flows to a treatment facility. When the sewer system is unable to carry these flows, the system becomes surcharged and an overflow will occur. Sanitary sewer overflows (SSOs) have existed since the introduction of separate sanitary sewers, and most are caused by inadequate operation, maintenance, and management of the collection system.

The SSO strategy addresses compliance and enforcement efforts by the Department to ensure compliance by publicly/privately owned treatment plants (PPOTWs) with the requirements of the statutes and their NPDES and ND permits. The Department has initiated a Sanitary Sewer Overflow Compliance and Enforcement Strategy to shift resources historically applied to treatment plant inspections to include evaluations of pump stations and collection systems. To assist evaluators in selecting candidate systems, staff will utilize the 303(d) list of impaired waters to identify waters impacted by fecal coliform or other appropriate pollutants and correlate those with collection systems with incidences of SSOs. The Department's Enforcement Referral Procedures Document will be used to determine when a PPOTW should be referred to enforcement for SSOs. The enforcement process allows for the Department to consider actions taken by the PPOTW such as: timely and proper notification, containment and mitigation of discharge, voluntarily conducting self evaluations, and requests for compliance assistance. The Department will take immediate action where it has been determined that SSOs have occurred and the PPOTW has not made timely and proper notification.

Referral Strategy for Effluent Violations

The Department has developed referral effluent violation guidelines to specifically address discharges into impaired waters. The goal of the referral guidelines is to reduce pollutant discharges into impaired waters in order to ultimately restore them to their full potential usage. To achieve this goal, enforcement actions are initiated earlier in an effort to improve the quality of waters which do not meet

standards. If a stream is impaired by a pollutant and the permit limit for that pollutant is exceeded more than once in a running annual reporting period, formal enforcement action will be initiated against the discharger.

SCDHEC'S Watershed Stewardship Programs

Public participation is an important component of the Department's Watershed Water Quality Management Program. Benefits to this interaction on the local level include improved public awareness about SCDHEC water programs, and increased local interest and participation in water quality improvement. Described below are some of the Department's water programs that encourage public interest and involvement in water quality.

Source Water Assessment Program

A safe, adequate source of drinking water is key to development of communities and the health of citizens. The Safe Drinking Water Act (SDWA) provides authority to protect sources of drinking water. As a result of the 1996 amendments to the SDWA, source water protection has become a national priority. States are required to develop a plan for assessment of source waters for all federally defined public groundwater and surface water systems.

The Source Water Assessment Program (SWAP) involves determining the boundaries of the areas that are the source of waters for public water systems. For groundwater systems, these areas are defined using groundwater flow models. For surface water systems, the 14-digit Hydrologic Unit Code watershed is the designated protection area (although certain areas within the basin will be segmented as being of greater vulnerability to contamination from overland flow, groundwater contributions to surface water, and direct spills into the surface water). Known and potential sources of contamination in the delineated area must be identified, and the inventoried sources evaluated to determine the susceptibility of public water systems to such contaminants. Assessments must be made available to the public.

Local involvement will be a critical factor in the success of the SWAP, and local government, citizen groups, environmental groups, water suppliers, and the Department must all work together to increase the general public's awareness of where drinking water comes from and how to better protect sources of drinking water. Implementation of source water protection activities will also occur at the local level, and local authorities may wish to base zoning and land-use planning on the source water assessments. The SWAP will be a key part of the Department's watershed management approach. To avoid duplication, information gathered from existing regulatory programs and/or watershed protection efforts will be utilized (e.g., ambient monitoring programs, TMDLs, etc.).

South Carolina Water Watch

South Carolina Water Watch is a unique effort to involve the public and local communities in water quality protection. The Water Watch program was developed to encourage South Carolina's citizens to become stewards of the State's lakes, rivers, streams, estuaries, and wetlands. Volunteers select a water resource on which to focus and perform activities aimed at protecting water quality, such as shoreline surveys, public education, and litter cleanups. The Water Watch coordinator assists participants with materials and training to help make projects successful. SCDHEC invites individuals, school groups, civic organizations, businesses, and local governments to learn about and protect the quality of our waterways by contacting the Water Watch coordinator at 803-898-4300.

Champions of the Environment

Champions of the Environment is a student recognition program that raises awareness of environmental issues. Nationally recognized for its innovative approach to environmental education, the program promotes hands-on learning by recognizing students working on exemplary environmental projects beyond the realm of the classroom. With scholarships and media coverage, Champions of the Environment encourages student initiative and self-esteem. The program promotes environmental awareness, leadership, conservation, creativity, and self-confidence through activities such as group projects, public speaking, and environmental research. Champions of the Environment is jointly sponsored by Dupont, International Paper, WIS-TV, and SCDHEC. For more information contact the Champions of the Environment coordinator at 803-898-4300.

Clean Water State Revolving Fund

Congress created the Clean Water State Revolving Fund (SRF) in 1987, to replace the §201 Construction Grants program. In doing so, 'state banks' were created to lend money for virtually any type of water pollution control infrastructure project. Project types include construction of wastewater treatment systems and nonpoint source pollution control. The interest rate on the loans is always below the current market rate. As repayments are made on the loans, funds are recycled to fund additional water protection projects. The vast majority of the SRF funds have been used for the construction of traditional municipal wastewater treatment systems. Because of its inherent flexibility, the SRF program is well suited to accommodate the watershed approach.

SRF loans are available to units of state, local, and regional government, and special purpose districts. South Carolina law prevents loans from being made directly to private organizations and individuals. Local governments such as cities and counties and other units of government such as Soil and Water Conservation Districts, Councils of Government, and Water and Sewer Districts are encouraged to apply for SRF loans for nonpoint source projects. Nonpoint source projects may include construction and maintenance of stormwater management facilities, establishment of a stormwater utility, purchase of land

for wetlands and riparian zones, and implementation of source water protection assessments. For more information contact the State Revolving Fund coordinator at 803-898-4300.

Citizen-Based Watershed Stewardship Programs

Throughout the Catawba River Basin, water quality is a common interest among citizen groups. The issues and membership of these groups vary widely. Some of the citizen groups interested in water quality in the South Carolina portion of the Catawba River Basin are described below.

Bi-State Catawba Task Force

Citizens, industries, local and county government officials, regional councils of government, and various government agencies in North Carolina and South Carolina are members of the Bi-State Catawba Task Force. The Task Force's goals are to promote education about water quality issues and to provide a forum for networking among groups and individuals interested in the Catawba River Basin.

Catawba River Foundation

The Catawba River Foundation was formed to protect the Catawba River Basin in both North Carolina and South Carolina through support of the Catawba Riverkeeper®. The Catawba Riverkeeper® program is part of a national Riverkeeper program acting as a watchdog for specific waterbodies of concern.

The Catawba Riverkeeper® has organized a group of Cove Keepers, Stream Keepers, and a Lake Keeper for Lake Wylie. The volunteers patrol the lake, learn how to detect problems and conduct water quality sampling in questionable areas. Volunteers report water quality problems for further investigation. The Riverkeeper® is working to set up a volunteer group of Keepers on each reservoir in the Catawba Basin, one reservoir at a time.

Catawba-Wateree Water Users Association

The Catawba-Wateree Water Users Association is comprised of water users in the Catawba and Wateree River Basins as well as other interested individuals and organizations. The group currently acts as a forum for networking and provides education about local water-related issues.

Implementation Committee of the South Carolina Catawba River Corridor Plan

This group formed to implement the recommendations presented in the South Carolina Catawba River Corridor Plan. Citizens, industries, local and county government officials, regional councils of

government, and various government agencies are members of this group. The group's interests are in the free flowing Catawba River from Lake Wylie dam to Fishing Creek Reservoir.

Land Trusts

Several land trusts exist in the basin. These organizations acquire property or easements to protect water quality, habitat, and /or views. Two of the land trusts include the Katawba Valley Land Trust and the Nation Ford Land Trust.

Tri-County Waste Water Committee

This committee is evaluating regional wastewater alternatives for York, Chester, and Lancaster counties in South Carolina. It's members include NPDES permit holders, local and county officials, state agencies, and interested citizens.

Wateree Home Owners Association (WHOA)

Members of the Wateree Home Owners Association (WHOA) of Fairfield County and WHOA of Kershaw County include property owners along Lake Wateree. The water quality of Lake Wateree and it's watershed are an interest item for both organizations. WHOA of Fairfield County and WHOA of Kershaw County have formed a joint Water Watch Committee. Currently, the Committee is sampling a total of 19 sites. Three sites are in the river channel in Lake Wateree and 16 are in the major embayments of the lake. The Water Watch Committee collects water temperature, specific conductance, dissolved oxygen, dissolved oxygen % saturation, dissolved oxygen change, depth, pH, NH4, NO3, and turbidity data.

West Wateree Improvement Association

The West Wateree Improvement Association formed in 1996 in response to a hydrochloric acid release by a local industry. Their interests also include water quality issues in the Wateree River watershed.

Catawba River Basin Description

The ***Catawba River*** flows through the Piedmont, Sandhills, and Upper Coastal Plain regions of the State, and encompasses 2,322 square miles and 21 watersheds. These some 1.5 million acres consist of 69.7% forested land, 11.8% agricultural land, 7.3% scrub/shrub land, 3.9% forested wetland, 3.8% urban land, 3.0% water, 0.4% barren land, and 0.1% nonforested wetland. There are a total of 2,943 stream miles and 26,308 acres of lake waters in the basin.

The Catawba River enters the State of South Carolina through Lake Wylie, which extends across the State boundary near Charlotte, North Carolina. Allison Creek flows into the midlake region of Lake Wylie within South Carolina. The Catawba River flows out of Lake Wylie and is joined by Sugar Creek, Twelvemile Creek, and Cane Creek before draining into Fishing Creek Reservoir. The Catawba River flows out of Fishing Creek Reservoir and joins with Fishing Creek and flows into Great Falls Reservoir. The river then joins with Camp Creek and Rocky Creek to form Cedar Creek Reservoir. Cedar Creek flows into the Catawba River just below the Cedar Creek Reservoir dam. The Catawba River joins Big Wateree Creek to form the Wateree River, which flows through Lake Wateree. Grannies Quarter Creek and Sawneys Creek flow into the Wateree River downstream of Lake Wateree. Twentyfive Mile Creek and Big Pine Tree Creek enter the river near the City of Camden, followed by Swift Creek, Spears Creek, and Colonels Creek before merging with the Congaree River Basin to form the Santee River Basin.

Physiographic Regions

The State of South Carolina has been divided into six Major Land Resource Areas (MLRAs) by the USDA Soil Conservation Service. The MLRAs are physiographic regions that have soils, climate, water resources and land uses in common. The physiographic regions that define the Catawba River Basin are as follows:

The **Blue Ridge** is an area of dissected (separated by erosion into many closely spaced valleys), rugged mountains with narrow valleys dominated by forests; elevations range from 1,000 to 3,300 feet.

The **Piedmont** is an area of gently rolling to hilly slopes with narrow stream valleys dominated by forests, farms and orchards; elevations range from 375 to 1,000 feet.

The **Sand Hills** are an area of gently sloping to strongly sloping uplands with a predominance of sandy areas and scrub vegetation; elevations range from 250 to 450 feet.

The **Upper Coastal Plain** is an area of gentle slopes with increased dissection and moderate slopes in the northwestern section that contain the State's major farming areas; elevations range from 100 to 450 feet.

Land Use/Land Cover

General land use/land cover data for South Carolina were derived from 1990 SCDNR SPOT multispectral satellite images using image mapping software to inventory the State's land classifications. The following classifications describe the Catawba River Basin:

Urban land is characterized by man-made structures and artificial surfaces related to industrial, commercial and residential uses, as well as vegetated portions of urban areas.

Agricultural/Grass land is characterized by cropland, pasture and orchards, and may include some grass cover in Urban, Scrub/Shrub and Forest areas.

Scrub/Shrub land is adapted from the western Rangeland classification to represent the "fallow" condition of the land (currently unused, yet vegetated), and is most commonly found in the dry Sandhills region including areas of farmland, sparse pines, regenerating forest lands and recently harvested timber lands.

Forest land is characterized by deciduous and evergreen trees not including forests in wetland settings.

Forested Wetland (swampland) is the saturated bottomland, mostly hardwood forests that are primarily composed of wooded swamps occupying river floodplains and isolated low-lying wet areas, primarily located in the Coastal Plain.

Nonforested Wetland (marsh)

Barren land is characterized by an unvegetated condition of the land, both natural (rock, beaches and unvegetated flats) and man-induced (rock quarries, mines and areas cleared for construction in urban areas or clearcut forest areas).

Water (non-land) includes both fresh and tidal waters.

Soil Types

The dominant soil associations, or those soil series together comprising over 40% of the land area, were recorded for each watershed in percent descending order. The dominant individual soil series for the Catawba River Basin are described as follows:

Ailey soils are well drained loamy and sandy soils with clayey or loamy subsoil.

Alpin soils are well drained and excessively drained, sandy soils with a loamy or sandy subsoil.

Appling soils are well drained, deep soils, brownish to red, firm clay in the main part of the subsoil, found on narrow to broad ridges.

Badin soils are moderately deep, well drained, moderately permeable, clayey soils that formed in material weathered from Carolina Slate or other fine grained rock, on ridgetops and side slopes.

Cecil soils are deep, well drained, gently sloping to sloping soils that have red subsoil.

Chastain soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Chewacla soils are nearly level, somewhat poorly drained and well drained soils.

Enon soils are well drained to somewhat poorly drained, shallow to deep soils, mainly brownish, firm to extremely firm clay loam to clay in the subsoil, on narrow and medium ridges.

Georgeville soils are gently sloping to sloping, well drained and moderately well drained soils.

Goldston soils are dominantly sloping to steep, well drained to excessively drained soils.

Helena soils are gently sloping to sloping, moderately well drained to well drained soils.

Herndon soils are gently sloping to sloping, well drained and moderately well drained soils.

Hiwassee soils are well drained, moderately sloping soils with clayey subsoil, moderately deep.

Iredell soils are well drained to somewhat poorly drained, shallow to deep soils, mainly brownish, firm to extremely firm clay loam to clay in the subsoil, on narrow and medium ridges.

Lakeland soils are well drained, sandy soils with loamy subsoil and excessively drained soils.

Lucy soils are well drained to poorly drained soils, some with a sandy surface layer and a loamy subsoil, and some are sandy throughout and subject to flooding.

Madison soils are well drained, moderately sloping soils, with clayey subsoil, moderately deep.

Mecklenburg soils are deep to moderately deep, gently sloping to strongly sloping, well drained to somewhat poorly drained soils with a loamy surface layer and a clayey subsoil and underlain by decomposed bedrock.

Pacolet soils are well drained, moderately steep soils with clayey subsoil, moderately deep.

Pelion soils are well drained and moderately well drained soils that have a sandy surface layer and a loamy subsoil, many with a fragipan in the subsoil.

Rion soils are well drained, gently sloping to steep, deep to moderately deep clayey and loamy soils.

Tatum soils are dominantly sloping to steep, well drained to excessively drained soils, with a loamy subsoil, moderately deep or shallow to weathered rock.

Tawcaw soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Vance soils are deep to moderately deep, gently sloping to sloping, well drained soils.

Vaucluse soils are well drained, loamy and sandy soils with clayey or loamy subsoil.

Wagram soils are well drained to very poorly drained, depressional to nearly level and gently sloping soils with a loamy to sandy surface layer and a clayey to loamy subsoil.

Wateree soils are well drained, loamy soils with a loamy or clayey subsoil.

Wilkes soils are dominantly strongly sloping to steep, well drained soils.

Winnsboro soils are well drained, gently sloping to steep, moderately deep to deep clayey soils.

Slope and Erodibility

The definition of soil erodibility differs from that of soil erosion. Soil erosion may be more influenced by slope, rainstorm characteristics, cover, and land management than by soil properties. Soil erodibility refers to the properties of the soil itself, which cause it to erode more or less easily than others when all other factors are constant.

The soil erodibility factor, K, is the rate of soil loss per erosion index unit as measured on a unit plot, and represents an average value for a given soil reflecting the combined effects of all the soil properties that significantly influence the ease of soil erosion by rainfall and runoff if not protected. K values closer to 1.0 represent higher soil erodibility and a greater need for best management practices to minimize erosion and contain those sediments which do erode. The range of K-factor values in the Catawba River Basin is 0.10 to 0.43.

Fish Consumption Advisory

At the time of publication, a fish consumption advisory issued by SCDHEC is in effect for the **Wateree River** advising people to limit the amount of some types of fish consumed from these waters. Fish consumption advisories are updated annually in March. For background information and the most current advisories please visit the Bureau of Water homepage at http://www.state.sc.us/dhec/eqc/water and click on "Advisories" under the Water Subject Index, or go directly to http://www.state.sc.us/dhec/eqc/admin/html/fishadv.html. For more information or a hard copy of the advisories, call SCDHEC's Division of Health Hazard Evaluation toll-free at (888) 849-7241.

Climate

Normal yearly rainfall in the Catawba River Basin is 45.95 inches, according to the S.C. historic climatological record. Data compiled from National Weather Service stations in Chester, Winnsboro, Winthrop College, Camden, Catawba, Great Falls, Wateree Dam, Fort Mill, and Tilghman for Nursery were used to determine the general climate information for this portion of the State. The highest level of rainfall occurs in the summer with 13.64 inches; 9.26, 11.19, and 11.86 inches of rain falling in the fall, winter, and spring, respectively. The average annual daily temperature is 61.7°F. Summer temperatures average 78.1°F and fall, winter, and spring temperatures are 62.6°F, 44.4°F, and 61.6°F, respectively.

Watershed Evaluations

03050101-180

(Catawba River/Lake Wylie)

General Description

Watershed 03050101-180 (formerly 03050101-190) is located in York County and consists primarily of the ***Catawba River flowing through Lake Wylie*** and its tributaries. The watershed occupies 45,989 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Goldston-Badin series. The erodibility of the soil (K) averages 0.20; the slope of the terrain averages 10%, with a range of 2-45%. Land use/land cover in the watershed includes: 63.0% forested land,12.3% agricultural land, 11.2% water, 9.2% scrub/shrub land, 3.0% urban land, and 1.3% barren land.

The Catawba River originates in North Carolina and flows through Lake Wylie into South Carolina in this watershed. Lake Wylie is used for both power generation and recreation. Tributaries draining into and forming arms of Lake Wylie in South Carolina include Catawba Creek, Mill Creek, Crowders Creek (South Fork, South Crowders Creek, Rocky Branch, Brown Creek, Beaverdam Creek, Camp Run), and Torrence Branch. There are a total of 37.1 stream miles and 4,500.1 acres of lake waters in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-197	P	FW	LAKE WYLIE ABOVE MILL CREEK ARM AT END OF S-46-557
CW-192	S	FW	SOUTH FORK AT S-46-79 4.5 MI NW OF CLOVER
CW-152	P	FW	CROWDERS CREEK AT US 321 0.5 MI N OF NC STATE LINE
CW-023	P	FW	CROWDERS CREEK AT S-46-564 NE CLOVER
CW-024	W/BIO	FW	CROWDERS CREEK AT S-46-1104
CW-105	S	FW	BROWN CREEK AT UNIMP RD 1.2 MI N OF CLOVER BELOW PLANT
CW-696	BIO	FW	BEAVERDAM CREEK AT S-46-114
CW-153	S	FW	BEAVERDAM CREEK AT S-46-152 8 MI E OF CLOVER
CW-027	S	FW	LAKE WYLIE, CROWDERS CK ARM AT SC 49 AND SC 274
CW-245	W	FW	LAKE WYLIE, CROWDERS CK ARM-1ST PWRLNE UPST MAIN POOL
CW-198	P	FW	LAKE WYLIE, OUTSIDE MOUTH OF CROWDERS CREEK ARM
CW-230	W	FW	LAKE WYLIE AT DAM, UNDER POWERLINES

Lake Wylie - There are five monitoring sites along Lake Wylie, which has a watershed covering 297.9 km^2 in South Carolina (the majority of the watershed is in North Carolina). The lake has a surface area of 5040.5 hectares, a maximum and mean depth of 28.4m and 6.9m, respectively, and a retention time of 39 days. Aquatic life uses are fully supported at ***CW-197***; however there is a significantly decreasing trend in dissolved oxygen and a significant increasing trend in turbidity. There is also a significant decreasing trend in pH.

Sediment samples reveal a wide array of pollutants, some occurring at elevated levels compared to other SCDHEC monitoring data. Very high concentrations of chromium were measured in the 1995, 1996, and 1997 sediment samples, and a high concentration was measured in the 1998 sample. Also in sediment, very high concentrations of copper were measured in the 1996, 1997, and 1998 samples, and a high concentration was measured in 1995. High concentrations of lead were measured in the 1995 and 1996 sediment samples and a very high concentration was measured in 1997. A very high concentration of nickel was measured in 1996, along with a high concentration in 1997. Zinc was found at very high levels in the 1996 and 1997 sediment samples, and was high in the 1998 sample. Recreational uses are fully supported at this site.

Aquatic life uses are fully supported at ***CW-027***; however there is a significant increasing trend in five-day biochemical oxygen demand and a very high concentration of zinc measured in 1997. High concentrations of copper were measured in the 1994 and 1995 sediment samples. High concentrations of zinc were measured in the 1994, 1995, and 1997 sediment samples. PCB-1248 was detected in the 1998 sample and P,P'DDT was detected in 1996. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions. Both aquatic life and recreational uses are fully supported at ***CW-245.***

Aquatic life uses are fully supported at ***CW-198***, but there is a significant decreasing trend in dissolved oxygen concentration. In sediment, high concentrations of chromium were measured in the 1994, 1996, and 1997 samples. Also in sediment very high concentrations of copper were measured in the 1994, 1996, 1997, and 1998 samples. A very high concentration of lead was measured in sediment in 1994, and high concentrations were measured in 1996, 1997, and 1998. A very high concentration of nickel was measured in sediment in 1994, and a high concentration in 1996. Very high concentrations of zinc were measured in the 1994, 1997, and 1998 sediment samples, and a high concentration was measured in 1996. Also in sediment, the pesticide malathion was detected in 1994, and P,P' DDE (a metabolite of DDT) was detected in the 1997 sample. Recreational uses are fully supported at this site. Aquatic life and recreational uses are fully supported at the site near the dam ***(CW-230)***.

Crowders Creek - There are three monitoring sites along Crowders Creek. At the upstream site ***(CW-152, in North Carolina)***, aquatic life uses are fully supported; however there is a significant increasing trend in total nitrogen concentration. A significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in turbidity suggest improving conditions for these parameters. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter. Aquatic life uses are also fully supported further downstream ***(CW-023)***; however there are significant increasing trends in total phosphorus and total nitrogen concentrations. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are not supported at this site due to fecal coliform bacteria excursions. At the furthest downstream site ***(CW-024)***, aquatic life uses are partially supported based on macroinvertebrate community data, and recreational uses are partially supported due to fecal coliform bacteria excursions.

South Fork (CW-192) - Aquatic life uses are fully supported. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Brown Creek (CW-105) - Aquatic life uses are fully supported. A significant increasing trend in dissolved oxygen concentrations and a significant decreasing trend in five-day biochemical oxygen demand suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Beaverdam Creek - There are two monitoring sites along Beaverdam Creek. At the upstream site ***(CW-696)***, aquatic life uses are fully supported based on macroinvertebrate community data. At the downstream site ***(CW-153)***, aquatic life uses are fully supported. There is a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION***
COMMENT	
LAKE WYLIE	SC0026743
TEGA CAY #2 WWTP	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.320	EFFLUENT
LAKE WYLIE	SC0026751
TEGA CAY #3 WWTP	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.290	EFFLUENT
PIPE #: 002 FLOW: 1.00	EFFLUENT
BEAVERDAM CREEK	SC0032662
BEAVER CREEK MHP	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.015	WATER QUALITY
WQL FOR NH3-N, TRC	
BEAVERDAM CREEK	SC0028321
PHARR YARNS/CLOVER DIV.	MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.014	WATER QUALITY
PIPE #: 002,003 FLOW: M/R	
WQL FOR TRC	
BEAVERDAM CREEK TRIBUTARY	SCG250066
BOWLING GREEN SPINNING CO.	MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.0025	EFFLUENT

MILL CREEK	SC0037605
LAKE WYLIE MHP	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.09	WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC	

Nonpoint Source Management Program

Camping Facilites

FACILITY NAME/TYPE	***PERMIT #***
RECEIVING STREAM	***STATUS***
EBENEZER PARK/FAMILY	46-307-0187
LAKE WYLIE	ACTIVE

Mining Activities

MINING COMPANY	***PERMIT #***
MINE NAME	***MINERAL***
COMMENTS	
MCCALL GRADING COMPANY, INC.	0926-91
MCCALL MINE	GRAVEL

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME	***PERMIT #***
FACILITY TYPE	***STATUS***
DUKE POWER CO.	463303-1601 (IWP-192, IWP-128)
INDUSTRIAL	ACTIVE
TEGA CAY 126, INC.	462436-1201 (CWP-033)
CONSTRUCTION	ACTIVE

Water Supply

WATER USER (TYPE)	***REGULATED CAPACITY (MGD)***
STREAM	***PUMPING CAPACITY (MGD)***
CITY OF ROCK HILL (M)	32.0
LAKE WYLIE	18.5

Growth Potential

Residential development along the frontage of Lake Wylie continues to increase, with densest areas located around Tega Cay, River Hills, and the lake shore north of Rock Hill. Residential development away from the lake is scattered, except in the Town of Clover. Commercial development continues to occur in the Lake Wylie Community along S.C. Hwy. 49. Another major land use factor is the Catawba Nuclear Station on the west side of the lake. Transportation projects which will have an impact on future growth include the widened Buster Boyd Bridge and S.C. Hwy. 49, both of which provide improved access into the Charlotte urban area and encourage further residential and commercial growth along the western shore of the lake.

The River Hills development and surrounding areas are now provided with water and sewer services from the City of York to the City of Rock Hill. This reduces the discharge of effluent into the lake, but it encourages more dense development along the lake frontage. The extension of lines will allow most of the frontage in South Carolina to be served with public sewer over the next few years, and gradually eliminating hundreds of septic tanks. In contrast to the high density development expected along the lake frontage, the western sections of the watershed should continue to have a rural residential character.

Watershed Protection and Restoration

Proposed "No Discharge" Designation for Lake Wylie

The Department is considering prohibiting the discharge of sewage from marine toilets into Lake Wylie. The waters of Lake Wylie are important from an economical and recreational standpoint for both North Carolina and South Carolina. The lake is owned by Duke Power Company of Charlotte, North Carolina. The Company maintains a nuclear station (S.C.), a hydropower station (S.C.), and a steam station (N.C.) on Lake Wylie. The lake is a reliable source of drinking water for the City of Rock Hill, which maintains a water intake. Although present water quality is good, the Department is concerned about the potential for future water quality degradation and believes that measures are needed to insure that present water quality is maintained.

Federal water quality standards prohibit the discharge of untreated sewage into the navigable waters of the United States. But sewage from marine toilets on boats is permitted provided it has undergone some disinfection and treatment. For certain waterbodies, like Lake Wylie, federal regulations allow states to designate them as "no discharge" to prohibit even treated discharges from boats. If the USEPA agrees to the no discharge designation, the Department will require protection beyond the federal minimum standard and all boats with marine toilets would no longer be allowed to discharge treated sewage into the lake. Instead, boats will have to pump-out their holding tanks at one of the two marinas the Department has identified as having pump-out, treatment, and disposal capabilities. In December 1999, the Department approved designating Lake Wylie as a “no discharge zone”. There was no opposition during the public hearing process. The designation is now pending before the legislature, which is expected to give it final approval.

03050101-190

(Allison Creek)

General Description

Watershed 03050101-190 (formerly 03050101-200) is located in York County and consists primarily of ***Allison Creek*** and its tributaries. The watershed occupies 42,482 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K) averages 0.28; the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 59.3% forested land, 19.7% agricultural land, 13.1% scrub/shrub land, 4.3% water, 2.6% urban land, and 1.0% barren land.

Allison Creek originates near the Town of Clover and is joined by Morris Branch, Calabash Branch (Walker Branch), Grist Branch, Johnson Branch (Rock Branch), and Big Branch before forming an arm of Lake Wylie near the City of York. Little Allison Creek is also impounded and flows into the Allison Creek arm of the lake. There are a total of 46.4 stream miles and 1,699.4 acres of lake waters in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-171	S	FW	ALLISON CREEK AT US 321 3.1 MI S OF CLOVER
CW-134	S	FW	CALABASH BRANCH AT S-46-414 2.5 MI SE OF CLOVER
CW-694	BIO	FW	ALLISON CREEK AT S-46-114
CW-200	S	FW	LAKE WYLIE, ALLISON CREEK ARM AT SC 274 9 MI NE OF YORK
CW-201	P	FW	LAKE WYLIE, NORTH LAKEWOODS SD AT EBENEZER ACCESS

Allison Creek - There are two monitoring sites along Allison Creek. At the upstream site ***(CW-171)***, aquatic life uses are fully supported. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter. Aquatic life uses are fully supported at the downstream site ***(CW-694)*** based on macroinvertebrate community data.

Calabash Branch (CW-134) - Aquatic life uses are fully supported. A significant increasing trend in dissolved oxygen concentration and significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Allison Creek Arm of Lake Wylie - There are two stations along this section of the lake and recreational uses are fully supported at both sites. Aquatic life uses are fully supported at ***CW-200.*** There is a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total phosphorus concentrations suggest improving conditions for these parameters. Aquatic life uses are also fully

supported at ***CW-201***, but there is a significant decreasing trend in dissolved oxygen concentration. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. In sediment, high concentrations of chromium were measured in the 1997 and 1998 samples. Also in sediment, very high concentrations of copper were measured in the 1997 and 1998 samples, and high concentrations were measured in the 1994 and 1995 samples. High concentrations of lead were measured in sediment in 1997 and 1998. A very high concentration of nickel was measured in sediment in 1997, and a high concentration in 1994. High concentrations of zinc were measured in the 1994, 1997, and 1998 sediment samples. The pesticide malathion was detected in sediment in 1994.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION***
COMMENT	
ALLISON CREEK TRIBUTARY	SC0002801
NORTH SAFETY PRODUCTS	MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.012	WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO	
ALLISON CREEK ARM OF LAKE WYLIE	SC0004278
DUKE POWER/CATAWBA NUCLEAR STATION	MAJOR INDUSTRIAL
PIPE #: 001-005 FLOW: M/R	EFFLUENT

Water Supply

WATER USER (TYPE)	***REGULATED CAPACITY (MGD)***
STREAM	***PUMPING CAPACITY (MGD)***
CATAWBA NUCLEAR STATION (I)	----
LAKE WYLIE	0.5

Growth Potential

The majority of this watershed is rural in nature; however, portions of the Town of Clover and areas fronting and near Lake Wylie have existing concentrated development. There are also a few areas of intensive farming. Water and sewer services are available in the immediate vicinity of Clover, and water has been extended along S.C. Hwy. 274 near Lake Wylie. Future growth trends should show continued residential development on Lake Wylie, continued expansion around Clover, and limited low density residential growth scattered throughout the rural areas. The Town of Clover eliminated its discharge and tied in with the City of Gastonia, N.C.

03050103-010

(Catawba River)

General Description

Watershed 03050103-010 is located in York, Lancaster, and Chester Counties and consists primarily of the ***Catawba River*** and its tributaries through to the Cedar Creek Dam. The watershed occupies 105,176 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Wilkes-Herndon-Helena-Georgeville series. The erodibility of the soil (K) averages 0.28; the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 68.7% forested land, 11.3% urban land, 7.6% water, 6.7% agricultural land, 5.1% scrub/shrub land, and 0.6% barren land.

The Catawba River flows through the Catawba Dam on Lake Wylie (03050101-180) near the Town of Fort Mill, and is joined by Johnnytown Branch, Big Dutchman Creek (Little Dutchman Creek), Dye Branch (Jones Branch), Manchester Creek, and Burgis Creek (all originating near the City of Rock Hill) before accepting drainage from the Sugar Creek watershed (03050103-020). Downstream from the Sugar Creek drainage, the Catawba River flows past the Catawba Indian Reservation and is joined by Haggins Branch, Sixmile Creek (Barber Creek), Ferry Branch, Abernathy Creek, Greene Creek, and the Twelvemile Creek watershed (03050103-030). The Landsford Canal connects the bend in the river where Twelvemile Creek enters. Further downstream, the river accepts the drainage of Rock Water Spring Branch, Dunn Creek, and the Cane Creek watershed (03050103-040) near the Town of Fort Lawn. The Catawba River then flows into Fishing Creek Reservoir, which is impounded by the Fishing Creek Dam. Bear Creek forms an arm of the reservoir.

The Catawba River is dammed again just downstream of the Fishing Creek Dam and the flow diverted to form Great Falls Reservoir. The retention time for Great Falls Reservoir is approximately one day, and essentially functions as an expanded area of the diverted Catawba River. The Fishing Creek watershed (03050103-060) drains into Great Falls Reservoir just below the Fishing Creek Dam. Great Falls Reservoir is impounded by the Dearborn Dam, and together with the Cedar Creek Dam downstream serve to back the water up into the true Catawba River bed to form Cedar Creek Reservoir. The section of the Catawba River upstream of Cedar Creek Reservoir and downstream of the Catawba River Diversion Dam is dry and serves as an emergency spillway. Great Falls Reservoir also has a dam between it and this dry section used for periods of flood. The Camp Creek watershed (03050103-080) drains into this section and forms a ponded area.

The Rocky Creek watershed (03050103-090) drains into the section of Cedar Creek Reservoir between the Dearborn Dam and the Cedar Creek Dam. Debutary Creek drains into and forms an arm of Cedar Creek Reservoir just above the Cedar Creek Dam. Duke Power Company oversees the operation of these reservoirs, and they are used for power generation as well as recreation. Fishing Creek Reservoir is also used for water supply. There are a total of 221.3 stream miles and 4,048.7 acres of lake waters in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-221	S	FW	CATAWBA RIVER TRIBUTARY AT HWY. 161 0.4 MI W OF I-77
CW-014	P	FW	CATAWBA RIVER AT US 21
CW-041	P	FW	CATAWBA RIVER AT SC 5 ABOVE BOWATER
CW-016	P	FW	CATAWBA RIVER AT SC 9 AT FORT LAWN
CW-016F	P	FW	FISHING CREEK RESERVOIR 2 MI BELOW CANE CREEK
CW-057	P	FW	FISHING CREEK RES. 75 FT ABOVE DAM NEAR GREAT FALLS
CW-174	S	FW	CATAWBA R. AT UNIMPROVED RD ABOVE JUNCTION W/ROCKY CK
CW-033	W	FW	CEDAR CREEK RESERVOIR 100 METERS NORTH OF DAM

Catawba River - There are four monitoring sites along this section of the Catawba River. Aquatic life uses are fully supported at the furthest upstream site ***(CW-014)***; however there was a high concentration of copper measured in 1997 and a very high concentration of zinc measured in 1996. Recreational uses are fully supported.

Further downstream ***(CW-041)***, aquatic life uses are also fully supported and significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. There is a significant decreasing trend in pH. The pesticides chlordane and P,P'DDT were detected in the 1995 sediment sample. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Aquatic life uses are also fully supported at ***CW-016***, but there is a significant increasing trend in total phosphorus concentrations and a high concentration of zinc measured in 1995. A significant decreasing trend in total suspended solids suggest improving conditions for this parameter. Recreational uses are fully supported.

Downstream of Fishing Creek Reservoir ***(CW-174)***, aquatic life uses are fully supported and a significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations.

Catawba River Tributary (CW-221) - Aquatic life uses are fully supported. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Fishing Creek Reservoir -There are two monitoring sites along Fishing Creek Reservoir, which has a watershed covering 820.3 km² within South Carolina (up to the Lake Wylie Dam), a surface area of 1363.8 hectares, and a maximum and mean depth of 27.3m and 7.2m, respectively. Aquatic life uses are fully supported at the uplake site ***(CW-016F)***; however there are significantly increasing trends in total phosphorus concentrations, total nitrogen concentrations, and turbidity. A high concentration of zinc was measured in 1994. In addition, high phosphorus concentrations and low transparency indicate the potential for adverse impacts to aquatic life due to eutrophication. High concentrations of copper were measured in the 1995, 1996, 1997, and 1998 sediment samples. Also in sediment, very high concentrations of zinc were measured

in 1996 and 1998, and high concentrations were measured in 1995 and 1997. The pesticide P,P'DDT was detected in 1995, O,P'DDE (a metabolite of DDT) in 1994, and P,P'DDE (another metabolite of DDT) was detected in the 1998 sediment sample. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are fully supported.

Downlake at ***CW-057***, aquatic life uses are fully supported; however there is a significant increasing trend in turbidity. In addition, elevated phosphorus concentrations and low transparency indicate the potential for adverse impacts to aquatic life due to eutrophication. In sediments, a very high concentration of chromium was measured in 1994, and high concentrations were measured in 1995, 1996, 1997, and 1998. Very high concentrations of copper and zinc were measured in all five sediment samples from 1994 through 1998. High concentrations of lead were also measured in the 1994 and 1995 sediment samples. A high concentration of mercury was measured in the 1995 sediment sample. Nickel was very high in the 1994 sediment sample, and high in 1995, 1996, and 1997. PCB-1248 was detected in the 1998 sediment sample. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Cedar Creek Reservoir (CW-033) - Cedar Creek Reservoir has a watershed encompassing 1,468 km^2 (up to the Fishing Creek Reservoir Dam), a surface area of 323.8 hectares, and a maximum and mean depth of 10.7m and 8.8m, respectively. The average annual retention time for the lake is 2 days. Although there was a pH excursion, due to the small number of samples, aquatic life use support determination is inconclusive. Elevated phosphorus concentrations indicate the potential for adverse impacts to aquatic life due to eutrophication. Recreational uses are fully supported.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
CATAWBA RIVER BOWATER, INC. PIPE #: 01A,001,003,004,005 FLOW: M/R WQL FOR BOD_5, DO	SC0001015 MAJOR INDUSTRIAL WATER QUALITY
CATAWBA RIVER CELANESE ACETATE LLC/CELRIVER (HOECHST CELANESE) PIPE #: 001 FLOW: M/R PIPE #: 002 FLOW: M/R PIPE #: 003 FLOW: M/R	SC0001783 MAJOR INDUSTRIAL WQL FOR NH3-N, TRC, DO EFFLUENT WQL FOR DO
CATAWBA RIVER SPRINGS IND./GRACE COMPLEX PIPE #: 001,01A,002 FLOW: M/R	SC0003255 MAJOR INDUSTRIAL EFFLUENT

PIPE #: 003 FLOW: M/R — WQL FOR DO, NH3-N

CATAWBA RIVER — SC0020443
CITY OF ROCK HILL/MANCHESTER CREEK PLT — MAJOR DOMESTIC
PIPE #: 001 FLOW: 20.0 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

CATAWBA RIVER — SC0020371
TOWN OF FORT MILL WWTP — MAJOR DOMESTIC
PIPE #: 001 FLOW: 1.5 — EFFLUENT
PIPE #: 001 FLOW: 2.0-3.0 (PROPOSED) — WQL FOR BOD5, DO

CATAWBA RIVER — SC0046892
CITY OF LANCASTER/MAIN PLANT — MAJOR DOMESTIC
PIPE #: 001 FLOW: 7.5 — WATER QUALITY
WQL FOR NH3-N, DO

CATAWBA RIVER — SC0027391
LANCASTER COUNTY P&D/FOSTER PLT — MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.053 — EFFLUENT

CATAWBA RIVER — SC0047864
LANCASTER COUNTY WWTP — MAJOR DOMESTIC
PIPE #: 001 FLOW: 4.0 — WATER QUALITY
WQL FOR DO; UNCONSTRUCTED

CATAWBA RIVER — SC0035360
NATION FORD CHEMICAL CO. (R-M INDUSTRIES) — MAJOR INDUSTRIAL
PIPE #: 01A FLOW: M/R — EFFLUENT
PIPE #: 01B FLOW: M/R — EFFLUENT

CATAWBA RIVER — SCG641013
LANCASTER COUNTY/CATAWBA RIVER WTP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.698 — EFFLUENT

CATAWBA RIVER — SCG645008
CITY OF ROCK HILL/ WTP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.698 — EFFLUENT

CATAWBA RIVER — SCG641008
CITY OF CHESTER/FT LAWN WTP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.698 — EFFLUENT

CATAWBA RIVER (CEDAR CREEK RES.) — SC0021211
TOWN OF GREAT FALLS/WWTP — MAJOR DOMESTIC
PIPE #: 001 FLOW: 1.4 — EFFLUENT

CATAWBA RIVER TRIBUTARY — SCG250135
SPRINGS IND./WHITE PLANT — MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.004 — EFFLUENT

CATAWBA RIVER TRIBUTARY — SCG250111
INCHEM CORP. — MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R — EFFLUENT
CATAWBA RIVER TRIBUTARY — SCG250137
SPRINGS IND./FT LAWN COMPLEX — MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.011 — EFFLUENT

PIPE #: 002 FLOW: 0.011
PIPE #: 003 FLOW: 0.011

BIG DUTCHMAN CREEK — SC0035661
WOODFOREST SD/WWTP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.039 — WATER QUALITY
WQL FOR NH3-N, TRC, DO

MANCHESTER CREEK — SCG250142
INLAND PAPERBOARD & PACKAGING — MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.024 — EFFLUENT

BURGIS CREEK TRIBUTARY — SC0028622
QUAIL MEADOW PARK — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.025 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

BARBER CREEK — SC0027189
UTILS. OF SC/SHANDON SD — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.014 — WATER QUALITY
WQL FOR NH3-N, TRC, DO

ABERNATHY CREEK — SC0032417
CEDAR VALLEY MHP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.03 — WATER QUALITY
WQL FOR NH3-N, TRC, DO

FISHING CREEK RESERVOIR — SC0029572
REPUBLIC FASTENER PRODUCTS — MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R — EFFLUENT

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE ***RECEIVING STREAM***	***PERMIT #*** ***STATUS***
BOWATER PARK CAMPGROUND/FAMILY CATAWBA RIVER	46-307-0186 ACTIVE

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
ASHE DIV., BORAL BRICKS, INC. YODER PIT #2	0523-57 CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*		*PERMIT #* *STATUS*
TOWN OF GREAT FALLS CONSTRUCTION	CLOSED	121002-1201 (121002-1201, CWP-012, DWP-903)
HOECHST CELANESE CORP. INDUSTRIAL		463312-1601 (IWP-138) ACTIVE
BOWATER, INC. INDUSTRIAL		463318-1601 (IWP-141) ACTIVE
LANDFILL INC. INDUSTRIAL		IWP-105 ---

Groundwater Contamination

The groundwater in the vicinity of the property owned by Rock Hill Chemicals - Rutledge Property (#SCD980844005) is contaminated with volatile organic compounds from spills, leaks, and unpermitted disposal. The contamination plume is discharging to a unnamed tributary of the Catawba River. The facility is a USEPA site, and is currently in the remediation phase.

Water Supply

WATER USER (TYPE) *STREAM*	*REGULATED CAPACITY (MGD)* *PUMPING CAPACITY (MGD)*
CHESTER METRO (M) CATAWBA RIVER	7.2 12.0
SPRINGS IND.-GRACE BLEACHERY (M) CATAWBA RIVER	30.4 40.2
SPRINGS IND.-GRACE BLEACHERY (I) CATAWBA RIVER	20.0 ---
CITY OF ROCK HILL (M) CATAWBA RIVER	10.0 14.0
BOWATER, INC. (I) CATAWBA RIVER	30.0 ---
HOECHST CELANESE CORP. (M) CATAWBA RIVER	7.0 7.2
HOECHST CELANESE CORP. (I) CATAWBA RIVER	72.0 ---
RM INDUSTRIES, INC. (I) CATAWBA RIVER	1.08 ---
CATAWBA WTP (M) CATAWBA RIVER	14.0 21.0

Growth Potential

Portions of the Cities of Rock Hill and Fort Mill are included in the upper portion of the watershed, and are relatively densely developed. On the Fort Mill side of the Catawba River, there is a relatively wide floodplain which will limit development adjacent to the river. Water and sewer service is available to most of the area on this side of the river, which includes a large portion of the Town of Fort Mill and the residential area west of the town. Potential growth areas include expansion around Fort Mill and the commercial and industrial development around the I-77/S.C. Hwy. 160 interchange. On the Rock Hill side of the river, there is extensive residential development in the city and to the north, with other developed residential areas to the east in the Friendship and Lesslie communities. Industrial areas have developed to the east of Rock Hill, and the large Bowater paper mill complex is located to the south. Extension of a water line from Rock Hill to the Bowater Facility has been completed, and will provide opportunities for higher density development in the area.

Portions of the Towns of Fort Lawn and Great Falls are located in the lower portion of this watershed. There is a concentrated area of industrial development along S.C. Hwy. 9 between Fort Lawn and the City of Lancaster, and there is a limited residential development along the shoreline of Fishing Creek. There is public water and sewer service in the Towns of Fort Lawn and Great Falls and water along S.C. Hwy. 9 and portions of U.S. Hwy. 21, but growth prospects are limited. Preliminary discussions by the Tri-County Wastewater Committee are being held concerning a possible regional sewer facility to be located on the Catawba River.

Crescent Resources, the real estate arm of Duke Energy, plans to develop a large mixed-use community along Fishing Creek Reservoir. The development would extend from S.C. Hwy. 9 down to S.C. Hwy. 200, within Lancaster County. The intention of the development company is to create "Catawba Ridge", a 16,000 home, densely populated residential area that would include commercial and industrial uses. Crescent Resources is also proposing development of the western side of Fishing Creek Reservoir.

Several additional factors will influence future development in the watershed. The presence of I-77 provides excellent access to the Charlotte urban area, encouraging residential, industrial, distribution, and commercial development. The proposed Dave Lyle Boulevard Extension will be built across the watershed and into Lancaster County, opening up large areas with good access to Rock Hill and I-77. The Rock Hill Economic Development Corporation is currently developing a major business park between I-77 and the Catawba River. Waterford will include areas for office, manufacturing, distribution, and residential uses, and will have an 18-hole golf course. The Catawba Indian Nation is continuing economic development along the river and its property. The many development factors, the presence of Rock Hill and Fort Mill, and the presence of I-77 with five full interchanges in this watershed all point to extensive growth over the next few years.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL for fecal coliform has been developed by DHEC and approved by EPA for **Catawba River tributary** water quality monitoring site CW-221. The TMDL states that a 19% reduction in fecal coliform loading from urban areas is necessary for the stream to meet the recreational use standard. Implementation of this nonpoint source TMDL will include the use of voluntary best management practices (BMPs) and other measures. Grant funding through SCDHEC may be available to aid in BMP implementation.

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

Cattle Ramp Demonstration

Sediments are a major component of NPS runoff in the Catawba River corridor. One source of the sediment runoff is from riparian areas that have been disturbed, such as cattle access to streams and other sources of water supply. The cattle movement produces unstable banks, leading to increased erosion. Fencing and a cattle ramp provide limited access to the waterbody, thus allowing the riparian zone to stabilize. Section 319 funds provided for demonstration of this BMP to farmers in York County. As a result of the field day held in conjunction with the project, eight local farmers applied for EQIP funds for cattle ramp installation on their property.

03050103-020

(Sugar Creek)

General Description

Watershed 03050103-020 (formerly 03050103-028) is located in York and Lancaster Counties and consists primarily of ***Sugar Creek*** and its tributaries. The watershed occupies 29,206 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Mecklenburg-Iredell series. The erodibility of the soil (K) averages 0.27; the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 73.4% forested land, 12.4% agricultural land, 7.2% scrub/shrub land, 4.5% urban land, 1.0% water, and 1.5% barren land.

Sugar Creek originates in North Carolina, near the City of Charlotte, and accepts drainage from Flint Hill Branch, Little Sugar Creek, and McAlpine Creek before reaching Steele Creek. Steele Creek also originates in North Carolina and accepts drainage from Blankmanship Branch and Jackson Branch before flowing through the Town of Fort Mill and into Sugar Creek. There are several lakes and ponds (Lake Patricia and Lake Haigler) near the Town of Fort Mill (totaling 81.6 acres) used for irrigation and recreation, and a total of 44.6 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-247	W	FW	SUGAR CREEK AT MECKLENBURG CO ROAD 51 (IN N.C.)
CW-248	W	FW	LITTLE SUGAR CREEK AT US 521 (IN N.C.)
CW-246	W/BIO	FW	SUGAR CREEK UPSTREAM OF CONFLUENCE WITH MCALPINE CREEK
CW-226	P	FW	MCALPINE CREEK AT US 521 IN NC
CW-064	S/BIO	FW	MCALPINE CREEK AT S-29-64
CW-009	S	FW	STEELE CREEK AT S-46-22 N OF FORT MILL
CW-203	W	FW	STEELE CREEK AT S-46-98
CW-681	BIO	FW	STEELE CREEK AT BY-PASS US 21
CW-011	S	FW	STEELE CREEK AT S-46-270
CW-013	P	FW	SUGAR CREEK AT SC 160 E OF FORT MILL
CW-036	S	FW	SUGAR CREEK AT S-46-36

Sugar Creek - There are four monitoring sites along Sugar Creek. Above Little Sugar Creek ***(CW-247 in North Carolina)***, aquatic life uses are not supported due to occurrences of cadmium in excess of the aquatic life acute standards. Recreational uses are partially supported due to fecal coliform bacteria excursions. Downstream of Little Sugar Creek ***(CW-246)***, aquatic life uses are partially supported based on macroinvertebrate community data. Recreational uses are not supported due to fecal coliform bacteria excursions.

Aquatic life uses are not supported downstream of Steele Creek ***(CW-013)***, due to occurrences of chromium and copper in excess of the aquatic life acute standards, compounded by a significant increasing trend in total phosphorus concentrations and a significant decreasing trend in pH. A significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in five-day biochemical oxygen

demand suggest improving conditions for these parameters. A high concentration of chromium was measured in the 1994 sediment sample, and very high concentrations were measured in the 1996 and 1998 samples. Recreational uses are not supported due to fecal coliform bacteria excursions. Aquatic life uses are fully supported at the furthest downstream site ***(CW-036)***, but recreational uses are not supported due to fecal coliform bacteria excursions.

Little Sugar Creek (CW-248) - This site is located just north of the South Carolina/North Carolina state line. Aquatic life uses are fully supported, but recreational uses are not supported due to fecal coliform bacteria excursions.

McAlpine Creek - There are two monitoring sites along McAlpine Creek. At the upstream site (***CW-226***, in North Carolina), aquatic life uses are fully supported; however there are significant increasing trends in five-day biochemical oxygen demand and total phosphorus concentrations. There is a significant decreasing trend in pH. In sediment, chromium was very high in the 1994, 1996, 1997, and 1998 samples. Aquatic life uses are not supported at the downstream site ***(CW-064)*** based on macroinvertebrate community data. Recreational uses are not supported at either site due to fecal coliform bacteria excursions, compounded by significant increasing trends in fecal coliform bacteria concentrations.

Steele Creek - There are four monitoring sites along Steele Creek. At the furthest upstream site ***(CW-009)***, aquatic life uses are fully supported. There is a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions. At the next site downstream ***(CW-203)***, aquatic life uses are fully supported, but recreational uses are not supported due to fecal coliform bacteria excursions.

Further downstream ***(CW-681)***, aquatic life uses are partially supported based on macroinvertebrate community data. At the furthest downstream site ***(CW-011)***, aquatic life uses are fully supported. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
SUGAR CREEK UTILS. OF SC/FOXWOOD PIPE #: 001 FLOW: 0.12	SC0027146 MINOR DOMESTIC EFFLUENT
SUGAR CREEK TRIBUTARY P. KAUFMANN INC. PIPE #: 001 FLOW: 0.002 WQL FOR BOD_5, NH3-N, TRC, DO	SC0022799 MINOR INDUSTRIAL WATER QUALITY

SUGAR CREEK TRIBUTARY — SC0035033
INDIANLAND SCHOOL WWTP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.03 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

SUGAR CREEK TRIBUTARY — SC0038563
FAITH TEMPLE BINGO — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.006 — WATER QUALITY
WQL FOR NH3-N, TRC, DO

DITCH TO SUGAR CREEK — SCG250094
WIKOFF COLOR CORP./WWTP — MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R — EFFLUENT

FLINT HILL BRANCH — SC0031208
TWIN LAKES MOBILE ESTATES — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.0625 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

MCALPINE CREEK — SC0030112
CWS/LAMPLIGHTER VILLAGE SD — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.63 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

STEELE CREEK — SC0024759
PINELAKES CAMPGROUND — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.038 — WATER QUALITY
WQL FOR NH3-N, TRC,DO

STEELE CREEK — SC0031151
PINECREST MHP — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.012 — EFFLUENT

JACKSON BRANCH — SC0041483
MACO COM. PRK/TARA PLANTATION — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.01 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

JACKSON BRANCH TRIBUTARY — SC0038113
UTILS. OF SC/CAROWOOD SD. — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.02 — WATER QUALITY
WQL FOR NH3-N, TRC, DO

Nonpoint Source Management Program

Mining Activities

MINING COMPANY — ***PERMIT #***
MINE NAME — ***MINERAL***
COMMENTS

CBM LANDFILL COMPANY — 1094-91
CBM LANDFILL MINE — SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
COOKS SHORT-TERM C&D CONSTRUCTION	291004-1301 (IWP-204) ----------
CONTAINER CORPORATION OF CAROLINA INDUSTRIAL	463323-6001 --------
JOHN HOWARD LANDFILL INDUSTRIAL	IWP-229 --------
SAM FISCHER LANDFILL INDUSTRIAL	IWP-207 --------
CUTSHAW LANDFILL CONSTRUCTION	462425-1201 (CWP-005) --------
COLTHARP LANDFILL CONSTRUCTION	462602-1201 ACTIVE

Land Application Sites

LAND APPLICATION SYSTEM *FACILITY NAME*	*ND#* *TYPE*
SPRAYFIELD LAZY DAZE CAMPGROUND	ND0067105 DOMESTIC

Groundwater Contamination

The groundwater in the vicinity of the property owned by Ft. Mill 66 (#09317) is contaminated with petroleum products from leaking underground storage tanks. The contamination plume is discharging to a tributary of Blankmanship Branch.

Growth Potential

This watershed contains a portion of the Town of Fort Mill and rapidly growing residential areas near I-77 in the Fort Mill Township. Major development factors include the Paramount Carowinds amusement park and surrounding industrial park area, and the Charlotte Knights baseball stadium. Industrial growth is expected surrounding the U.S. Hwy. 521/S.C. Hwy. 160 interchange. Water service is present in all sections of the watershed, except for some area east of Fort Mill. Sewer service is present in Fort Mill and surrounding areas. The new Steele Creek sewer line has eliminated the smaller treatment plants and will open the area for denser development. The presence of the expanding Charlotte urban area just across the State line and the easy access via I-77 result in a strong growth trend, which should continue into the near future. Transportation factors which will have an impact on the area include the in-progess widening of I-77, a proposed Fort Mill bypass for S.C. Hwy. 160, and a connector being constructed between the Heritage retreat and Mecklenburg County, N.C.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050103-030

(Twelvemile Creek/ Waxhaw Creek)

General Description

Watershed 03050103-030 (formerly 03050103-038) is located in Lancaster County and consists primarily of ***Twelvemile Creek, Waxhaw Creek,*** and their tributaries. The watershed occupies 30,093 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Appling-Vance-Cecil-Enon series. The erodibility of the soil (K) averages 0.32; the slope of the terrain averages 7%, with a range of 2-15%. Land use/land cover in the watershed includes: 71.5% forested land, 22.8% agricultural land, 4.3% scrub/shrub land, 0.8% water, 0.4% barren land, and 0.2% urban land.

The Twelvemile Creek watershed originates in North Carolina and drains into the Catawba River. Cow Branch and Tarkill Branch (Long Branch) flow into Sixmile Creek, which drains into Twelvemile Creek. Twelvemile Creek also accepts drainage from Rone Branch, Millstone Branch, and Todd Branch before entering the Catawba River. Waxhaw Creek accepts drainage from Causar Creek (Andrew Jackson State Park Lake) and Mill Branch (Foster Branch) flows into the Catawba River downstream of Twelvemile Creek. There are a total of 79.2 stream miles and several small lakes and ponds in this watershed (totaling 97.4 acres), all classified FW.

Water Quality

Station #	Type	Class	Description
CW-176	P	FW	SIXMILE CREEK AT S-29-54
CW-083	S	FW	TWELVEMILE CREEK AT S-29-55 0.3 MI NW OF VAN WYCK
CW-145	W	FW	WAXHAW CREEK AT S-29-29

Twelvemile Creek (CW-083) - Aquatic life uses are fully supported. A significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in five-day biochemical oxygen demand suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Sixmile Creek (CW-176) - Aquatic life uses are not supported due to occurrences of zinc in excess of the aquatic life acute standards, including a very high concentration measured in 1994 and a high concentration measured in 1996. In addition, there was a very high concentration of copper measured in 1995, and significant increasing trends in five-day biochemical oxygen demand and total nitrogen concentrations. There is also a decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Waxhaw Creek (CW-145) - Aquatic life uses are fully supported. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION (EL/WQL)*
CAUSAR BRANCH HEALTH SOUTH/CENTRAL CAROLINAS PIPE #: 001 FLOW: 0.008 WQL FOR BOD_5, NH3-N, TRC, DO	SC0041807 MINOR DOMESTIC WATER QUALITY

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
ASHE DIV., BORAL BRICKS, INC. MILLER PIT	0003-57 SHALE
ASHE DIV., BORAL BRICKS, INC. ROBERT YODER PIT	0004-57 SERICITE
ASHE DIV., BORAL BRICKS, INC. FAILE MINE	0778-57 CLAY
PRESSLEY MINING COMPANY PRESSLEY MINE	0808-57 CLAY
FRANK WILLIAMS COMPANY. FRANK WILLIAMS MINE	1109-57 CLAY, TOPSOIL

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
COMBS SHORT-TERM C&D LANDFILL CONSTRUCTION	292903-1301 -------
FRANK LANDFILL CONSTRUCTION	292900-1301 -------
HOOD SHORT TERM C&D LANDFILL CONSTRUCTION	292902-1301 -------

Land Application Sites

LAND APPLICATION SYSTEM *FACILITY NAME*	*ND#* *TYPE*

OXYDATION POND	ND0067989
JINGLE JUNGLE INC.	DOMESTIC

Growth Potential

This area is adjacent to rapidly growing sections of the Charlotte urban area and has good access via the four-lane U.S. Hwy. 521. Although the entire watershed is served by public water, there is currently no sewer service available. The lack of sewer service will slow dense development in this area, but scattered residential development will likely continue. An extension of Dave Lyle Boulevard from Rock Hill has been proposed, which would cross the Catawba River and pass through this watershed. An additional potential for growth is the proposed Tri-County Regional sewer plant, which could be located on the Catawba River south of S.C. Hwy. 5. If built, this plant could provide sewer service to the area.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050103-040

(Cane Creek)

General Description

Watershed 03050103-040 (formerly 03050103-042) is located in Lancaster County and consists primarily of ***Cane Creek*** and its tributaries. The watershed occupies 90,107 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Helena-Herdon-Georgeville-Appling series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 12%, with a range of 2-45%. Land use/land cover in the watershed includes: 65.8% forested land, 19.0% agricultural land, 9.3% urban land, 4.4% scrub/shrub land, 0.9% water, and 0.6 barren land.

Cane Creek originates in North Carolina and accepts drainage from Simpson Branch, Unity Branch, Flag Pond Branch, McAteer Branch, Sandy Branch, Cedar Pines Lake, and Camp Creek (North Prong, South Prong). Further downstream, the Bear Creek drainage enters Cane Creek. Bear Creek accepts drainage from Caney Branch and Dry Branch before flowing through the Lancaster Reservoir. Lancaster Reservoir (75 acres) is used for municipal and recreational purposes for the Town of Lancaster. Turkey Quarter Creek (Little Turkey Creek) flows into Bear Creek at the reservoir, and further downstream Gills Creek (Hannahs Creek) enters near the Town of Lancaster. Rum Creek drains into Cane Creek near the Town of Fort Lawn. There are numerous small lakes and ponds (totaling 371.4 acres) for flood control purposes and a total of 233.5 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-185	S	FW	CANE CREEK AT SC 200 5 MI NNE OF LANCASTER
CW-210	BIO	FW	CANE CREEK AT SC 9
CW-151	S	FW	BEAR CREEK AT S-29-362 3.5 MI SE OF LANCASTER
CW-047	S	FW	GILLS CREEK AT US 521 NNW OF LANCASTER
CW-131	S	FW	BEAR CREEK AT S-29-292 1.6 MI W OF LANCASTER
CW-017	S	FW	CANE CREEK AT S-29-50
CW-232	W	FW	RUM CREEK AT S-29-187

Cane Creek - There are three monitoring sites along Cane Creek. At the furthest upstream site ***(CW-185)***, aquatic life uses are partially supported due to dissolved oxygen excursions. This is a secondary monitoring station and sampling is intentionally biased towards periods with potentially low dissolved oxygen concentrations. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are partially supported due to fecal coliform bacteria excursions.

At the next site downstream ***(CW-210)***, aquatic life uses are partially supported based on macroinvertebrate community data. Aquatic life uses are not supported at the furthest downstream site ***(CW-017)*** due to dissolved oxygen excursions. This is another secondary monitoring station and sampling is

intentionally biased towards periods with potentially low dissolved oxygen concentrations. Recreational uses are not supported due to fecal coliform bacteria excursions.

Bear Creek - There are two monitoring sites along Bear Creek. Upstream of Gills Creek ***(CW-151)***, aquatic life uses are not supported due to dissolved oxygen excursions. There is a significant increasing trend in pH. This is a secondary monitoring station and sampling is intentionally biased towards periods with potentially low dissolved oxygen concentrations. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Downstream of Gills Creek ***(CW-131)***, aquatic life uses are partially supported due to dissolved oxygen excursions. This is also a secondary monitoring station and sampling is intentionally biased towards periods with potentially low dissolved oxygen concentrations. A significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in five-day biochemical oxygen demand suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations.

Gills Creek (CW-047) - Aquatic life uses are not supported due to dissolved oxygen excursions. There is a significant increasing trend in pH. This is a secondary monitoring station and sampling is intentionally biased towards periods with potentially low dissolved oxygen concentrations. Recreational uses are not supported due to fecal coliform bacteria excursions.

Rum Creek (CW-232) - Aquatic life uses are not supported due to dissolved oxygen excursions. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION***
BEAR CREEK SPRINGS IND./LANCASTER PLT PIPE #: 001 FLOW: 0.01	SCG250136 MINOR INDUSTRIAL EFFLUENT
CANE CREEK MCATEER TRAILER PARK PIPE #: 001 FLOW: .00565 WQL FOR NH3-N, TRC, DO	SC0027383 MINOR DOMESTIC WATER QUALITY

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*	
FRANKS TIRE PROCESSING TIRE PROCESSING	292414-5201 --------	
SNIPES SHORT-TERM C&D LANDFILL CONSTRUCTION	292648-1301 --------	
SPRINGS INDUSTRIES INDUSTRIAL/CONSTRUCTION	293314-1201 -------	(CWP-023, IWP-080 IWP-081, IWP-134, IWP-102)
PARNELL INERT LANDFILL INDUSTRIAL	IWP-213 -------	

Growth Potential

The City of Lancaster is located in this watershed, and has densely developed areas of residential, commercial, and industrial land uses. The City of Lancaster has expanded its wastewater treatment plant and relocated the outfall to the Catawba River. This will allow for increased industrial and municipal flows. A large area of residential development extends into the countryside to the south of the city, and also along S.C. Hwy. 9 and S.C. Hwy. 903 to the east and U.S. Hwy. 521 and S.C. Hwy. 200 to the north. Significant industrial and commercial growth is occurring on the north side of the city along the S.C. Hwy. 9 Bypass. Rail lines to the Cities of Rock Hill and Chester run along S.C. Hwy. 9. Water service is available along major roads throughout the watershed. Sewer service is available in the City of Lancaster, in the residential areas to its south,and along S.C. Hwy. 903 east of the city.

Crescent Resources, the real estate arm of Duke Energy, plans to develop a large mixed-use community along Fishing Creek Reservoir, and would affect a portion of this watershed. The development would extend from S.C. Hwy. 9 down to S.C. Hwy. 200, within Lancaster County. The intention of the development company is to create “Catawba Ridge”, a 16,000 home, densely populated residential area, that would include commercial and industrial uses.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

Lancaster Greenway Preserve Buffer Strip Restoration

The Katawba Valley Land Trust (KVLT) will restore riparian forest buffers along the Catawba River tributaries on land owned by the KVLT. This project contributes to implementation of the Catawba River Corridor Plan and includes an educational component.

03050103-050

(Fishing Creek)

General Description

Watershed 03050103-050 is located in York County and consists primarily of ***Fishing Creek*** and its tributaries from its origin to its confluence with Wildcat Creek. The watershed occupies 31,765 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Appling-Hiwassee series. The erodibility of the soil (K) averages 0.25; the slope of the terrain averages 6%, with a range of 2-15%. Land use/land cover in the watershed includes: 52.0% forested land, 24.4% agricultural land, 5.9% urban land, 1.7% barren land, 0.8% water, and 15.1% scrub/shrub land.

Fishing Creek originates near the City of York, and this stream segment accepts drainage from Langham Branch and Hope Branch. There are several lakes and ponds (totaling 152.1 acres) used for recreation and flood control in this watershed and 38.0 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-029	P	FW	FISHING CREEK AT SC 49 NE YORK
CW-031	BIO	FW	FISHING CREEK AT SC 161
CW-005	P/BIO	FW	FISHING CREEK AT S-46-347 DOWNSTREAM OF YORK WWTP
CW-225	S/BIO	FW	FISHING CREEK AT S-46-503

Fishing Creek - There are four monitoring sites along this upper section of Fishing Creek. Aquatic life uses are fully supported at the furthest upstream site ***(CW-029)***. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions. At the next site downstream ***(CW-031)***, aquatic life uses are fully supported based on macroinvertebrate community data.

Further downstream ***(CW-005)***, aquatic life uses are partially supported based on macroinvertebrate community data. A significant decreasing trend in total phosphorus concentrations suggests improving conditions for this parameter. Recreational uses are partially supported due to fecal coliform bacteria excursions. Aquatic life uses are fully supported at the furthest downstream site ***(CW-225)***. There is a significant decreasing trend in pH. The PAHs fluoranthene, phenanthrene, and pyrene were detected in the 1994 sediment sample. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION***
COMMENT	
FISHING CREEK	SC0038156

CITY OF YORK/FISHING CREEK WWTP PIPE #: 001 FLOW: 2.0 WQL FOR BOD_5, NH3-N, TRC, DO	MAJOR DOMESTIC WATER QUALITY
FISHING CREEK TRIBUTARY SCANA PROPANE STORAGE, INC. PIPE #: 001 FLOW: 0.01 WQL FOR BOD_5, NH3-N, TRC, DO	SC0046248 MINOR INDUSTRIAL WATER QUALITY
HOPE BRANCH MCAFEE MHP PIPE #: 001 FLOW: .018 WQL FOR NH3-N, TRC, DO	SC0027111 MINOR DOMESTIC WATER QUALITY

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
ALBERT D. OLIPHANT INTERPROP 49/5 MINE	1096-91 SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
YORK COUNTY LANDFILL MUNICIPAL	461001-1101 (DWP-103, DWP-085, DWP-010, 461001-1102, 461001-6001) CLOSED
ROGERS CELLULOSIC LANDFILL CONSTRUCTION	462427-1201 (CWP-017) ACTIVE

Growth Potential

The majority of growth in this watershed is concentrated around the City of York. Water and sewer service are available in York and in several surrounding areas. The East York Industrial Park is a factor in the future development of the area. Another factor that may promote growth includes the rail lines from York to the Cities of Rock Hill, Columbia, and Charlotte.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the

WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050103-060

(Fishing Creek)

General Description

Watershed 03050103-060 extends through York and Chester Counties and consists primarily of ***Fishing Creek*** and its tributaries from Wildcat Creek to Great Falls Reservoir. The watershed occupies 136,109 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Pacolet-Mecklenburg-Iredell series. The erodibility of the soil (K) averages 0.22; the slope of the terrain averages 8%, with a range of 2-25%. Land use/land cover in the watershed includes: 61.0% forested land, 17.6% agricultural land, 13.4% scrub/shrub land, 6.1% urban land, 1.4% barren land, and 0.5% water.

This segment of Fishing Creek accepts the drainage from the upper reach (03050103-050) and from Wildcat Creek (Tools Fork, Dye Creek), which originates near the City of Rock Hill. Taylor Creek enters Fishing Creek downstream of Wildcat Creek, followed by Stoney Fork, Browns Branch, and Clinton Branch. Further downstream, South Fork Fishing Creek (Love Creek, Conrad Creek) merges with Fishing Creek followed by Hicklin Branch (McFadden Branch), the Tinkers Creek watershed (03050103-070), Reeves Creek, and Dairy Branch near the Town of Fort Lawn. Lake Oliphant (40 acres) is located on a tributary to Conrad Creek and is used for recreational purposes. There are several other ponds and lakes in the watershed (totaling 190.8 acres) used for irrigation and recreation. Fishing Creek empties into and forms the headwaters of Great Falls Reservoir. There are a total of 274.2 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-006	S	FW	WILDCAT CREEK AT S-46-650
CW-212	S	FW	TOOLS FORK AT S-46-195 7 MI NW OF ROCK HILL
CW-096	S	FW	WILDCAT CREEK AT S-46-998 9 MI ENE OF MCCONNELLS
CW-224	S	FW	FISHING CREEK AT S-46-163
CW-697	BIO	FW	STONEY FORK AT SC 121 &72
CW-695	BIO	FW	TAYLOR CREEK AT S-46-735
CW-654	BIO	FW	FISHING CREEK AT S-46-655
CW-007	BIO	FW	SOUTH FORK FISHING CREEK AT S-12-50
CW-008	P	FW	FISHING CREEK AT SC 223 NE RICHBURG
CW-233	W	FW	FISHING CREEK AT S-12-77
CL-021	W	FW	LAKE OLIPHANT, FOREBAY EQUIDISTANT FROM DAM & SHORE

Fishing Creek **-** There are four monitoring sites along this lower section of Fishing Creek. Aquatic life uses are fully supported at the furthest upstream site ***(CW-224)***. There is a significant decreasing trend in pH. A high concentration of chromium was measured and di-n-butylphthalate was detected in the 1995 sediment sample. The PAHs fluoranthene, phenanthrene, pyrene, and benzo(a)anthracene were detected in the 1997 sediment sample, and PCB-1248 was detected in the 1998 sample. A significant decreasing trend in total phosphorus concentrations suggests improving conditions for this parameter. Recreational uses are not

supported at this site due to fecal coliform bacteria excursions. At the next site downstream ***(CW-654)***, aquatic life uses are partially supported based on macroinvertebrate community data.

Aquatic life uses are fully supported at ***CW-008;*** however there was a high concentration of zinc measured in 1994 and a high concentration of chromium measured in 1996. There is a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are partially supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations. At the furthest downstream site ***(CW-233)***, aquatic life uses are fully supported; however there was a very high concentration of copper measured in 1998. Recreational uses are partially supported due to fecal coliform bacteria excursions.

South Fork Fishing Creek (CW-007) - Aquatic life uses are partially supported based on macroinvertebrate community data.

Wildcat Creek - There are two monitoring sites along Wildcat Creek. Aquatic life uses are fully supported at the upstream site ***(CW-006)***; however very high concentrations of lead and zinc were measured in the 1997 sediment sample. Also in sediments, PCB-1248 was detected in the 1998 sample and O,P'DDE (a metabolite of DDT) was detected in 1994. Although the use of DDT was banned in 1973, it is very persistent in the environment. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Downstream of Tools Fork ***(CW-096)***, aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute standards. In addition, there was a high concentration of chromium measured in 1997. There is also a significant decreasing trend in pH. A significant increasing trend in dissolved oxygen concentration and significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentration, and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Tools Fork (CW-212) - Aquatic life uses are fully supported; however there is a significant increasing trend in total phosphorus concentrations. There is a significant decreasing trend in pH. A significant increasing trend in dissolved oxygen concentration and significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Stoney Fork (CW-697) - Aquatic life uses are partially supported based on macroinvertebrate community data.

Taylor Creek (CW-695) - Aquatic life uses are partially supported based on macroinvertebrate community data.

Lake Oliphant (CL-021) - Lake Oliphant has a watershed extending over 1.1 km², a surface area of 16.2 hectares, and a maximum and mean depth of 6.7m and 1.7m, respectively. Grass carp were introduced into Lake Oliphant in 1992 as a biological control of aquatic plants to provide public access for boating and fishing. The fish stocking was successful and no additional treatments were necessary to control the aquatic plants. Although there was a pH excursion, due to the small number of samples, determination of aquatic life use support is inconclusive. Recreational uses are fully supported.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
FISHING CREEK CITY OF CHESTER/LANDO-MANETTA PLT PIPE #: 001 FLOW: 0.50 WQL FOR NH3-N, TRC, DO	SC0001741 MINOR DOMESTIC WATER QUALITY
TOOLS FORK UTILS. OF SC/COUNTRY OAKS SD PIPE #: 001 FLOW: .020 WQL FOR BOD_5, NH3-N, TRC, DO	SC0039217 MINOR DOMESTIC WATER QUALITY
TOOLS FORK TRIB ADNAH RD MHP/BLUE RIBBON WATER PIPE #: 001 FLOW: .040 WQL FOR BOD_5, NH3-N, TRC, DO UNCONSTRUCTED	SC0041670 MINOR DOMESTIC WATER QUALITY
DYE CREEK YORK PRINTING & FINISHING, INC. PIPE #: 001 FLOW: M/R (SCG645038 AS OF 8/31/99)	SC0029378 MINOR INDUSTRIAL EFFLUENT
TAYLOR CREEK MARTIN MARIETTA/ROCK HILL QUARRY PIPE #: 001 FLOW: M/R	SCG730061 MINOR INDUSTRIAL EFFLUENT
CLINTON BRANCH PINETUCK SDPINETUCK UTILS. PIPE #: 001 FLOW : 0.15 WQL FOR BOD_5, NH3-N, TRC, DO UNCONSTRUCTED	SC0041203 MINOR DOMESTIC WATER QUALITY
CLINTON BRANCH KENTUCKY-CUMBERLAND COAL CO. PIPE #: 001 FLOW: M/R	SC0042129 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME* *COMMENTS*	*PERMIT #* *MINERAL*
REA CONSTRUCTION CO. FISHING CREEK MINE INSTREAM DREDGING	0178-23 SAND
LINEBERGER GRADING & PAVING WALLACE SAND PIT INSTREAM DREDGING	0605-23 SAND
MARTIN MARIETTA AGGREGATES ROCK HILL QUARRY	0104-91 GRANITE
RAMBO ASSOCIATES RAMBO ASSOCIATES MINE	1112-91 GRANITE

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
CITY OF ROCK HILL MUNICIPAL	261002-1702 (CWP-025, 461002-1202) ACTIVE
CITY OF ROCK HILL MUNICIPAL	461002-1201 (DWP-901) ---
COUNTY SQUIRE S/T LC DEBRIS CONSTRUCTION	462452-1701 (462452-1301) ACTIVE
POPE CONSTRUCTION C/C LANDFILL CONSTRUCTION	462424-1201 (CWP-002, IWP-165, 462424-1601) ---

Growth Potential

The major development factor in this watershed is the southern and western portions of the City of Rock Hill. Portions of the Towns of McConnells, Lowrys, Richburg, Fort Lawn, and Great Falls, together with the unincorporated communities of Edgemoor and Lando, are also located in this watershed. Water and sewer services are limited to the areas around Rock Hill and the S.C. Hwy. 9 corridor in Chester County. However, the Chester Metro District is discussing extending a line down from Rock Hill along S.C. Hwy. 901 and up from Chester along S.C. Hwy. 9. Some industrial development occurs along the S.C. Hwy. 9 corridor. I-77 extends through the area, but there is only one interchange and it has no utilities. The area around McConnells and Lowrys has a high level of agricultural activity. The potential for future development is greatest near the Rock Hill area and the S.C. Hwy. 9 corridor. The City of Chester has proposed expanding facilities that discharge to Fishing Creek in order to serve the growth of the area.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050103-070

(Tinkers Creek)

General Description

Watershed 03050103-070 is located in York and Chester Counties and consists primarily of ***Tinkers Creek*** and its tributaries. The watershed occupies 16,973 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Pacolet-Cecil-Wilkes-Madison series. The erodibility of the soil (K) averages 0.28; the slope of the terrain averages 10%, with a range of 2-40%. Land use/land cover in the watershed includes: 77.5% forested land, 11.3% agricultural land, 10.0% scrub/shrub land, 0.7% water, 0.4% urban land, and 0.1% barren land.

Tinkers Creek accepts the drainage of Rum Branch and Neelys Creek before draining into Fishing Creek. There are a total of 40.5 stream miles in this watershed and a few ponds (totaling15.1 acres) used for flood control and recreation, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-227	S	FW	NEELYS CREEK AT 2-46-997
CW-234	W/BIO	FW	TINKERS CREEK AT S-12-599

Tinkers Creek (CW-234) - Aquatic life uses are partially supported based on macroinvertebrate data, compounded by a single dissolved oxygen and a single pH excursion. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Neelys Creek (CW-227) - Aquatic life uses are fully supported. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
NEELYS CREEK NEELYS CREEK HOMES, INC. PIPE #: 001 FLOW: .008 WQL FOR NH3-N, TRC	SC0041904 MINOR DOMESTIC WATER QUALITY
NEELYS CREEK TRIBUTARY JACK NELSON ENTERPRISES PIPE #: 001 FLOW: .012 WQL FOR NH3-N, TRC, DO	SC0027341 MINOR DOMESTIC WATER QUALITY

Growth Potential

This watershed is primarily rural, with some residential density in the extreme northern section as a result of the City of Rock Hill. Water service is available only in this limited area, otherwise no utilities are available, and there is little indication of future growth. There are substantial areas of forests, with some forestry activity.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050103-080

(Camp Creek)

General Description

Watershed 03050103-080 is located in Lancaster County and consists primarily of ***Camp Creek*** and its tributaries. The watershed occupies 26,307 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Helena-Pacolet-Cecil series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 88.5% forested land, 7.6% agricultural land, 3.0% scrub/shrub land, 0.6% barren land, 0.2% forested wetland, and 0.1% water.

Camp Creek originates near the City of Lancaster and accepts the drainage of Dry Creek before flowing into Cedar Creek Reservoir. There are several recreational ponds (totaling 35.0 acres) and a total of 65.0 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-084	BIO	FW	CAMP CREEK AT S-29-20
CW-235	W	FW	CAMP CREEK AT SC 97

Camp Creek - There are two monitoring sites along Camp Creek. Aquatic life uses are fully supported at the upstream site ***(CW-084)*** based on macroinvertebrate community data. At the downstream site ***(CW-235)***, aquatic life uses are fully supported, but recreational uses are partially supported due to fecal coliform bacteria excursions.

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME / *FACILITY TYPE*	*PERMIT #* / *STATUS*
LANCASTER COUNTY LANDFILL MUNICIPAL	291001-1101 (DWP-120) CLOSED
LANCASTER COUNTY LANDFILL MUNICIPAL	291001-1201 --------
CITY OF LANCASTER TRANS. STA.& LANDFILL MUNICIPAL	291003-6001 (DWP-025) CLOSED

Growth Potential

Crescent Resources, the real estate arm of Duke Energy, plans to develop a large mixed-use community along Fishing Creek Reservoir, and would affect a portion of this watershed. The development would extend from S.C. Hwy. 9 down to S.C. Hwy. 200, within Lancaster County. The intention of the

development company is to create “Catawba Ridge”, a 16,000 home, densely populated residential area, that would include commercial and industrial uses.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL for fecal coliform has been developed by DHEC and approved by EPA for **Camp Creek** water quality monitoring site CW-235. The TMDL states that a 44% reduction in fecal coliform loading from agricultural lands is necessary for the stream to meet the recreational use standard. Implementation of this nonpoint source TMDL will include the use of voluntary best management practices (BMPs). Grant funding through DHEC may be available to aid in BMP implementation.

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050103-090

(Rocky Creek)

General Description

Watershed 03050103-090 is located in Chester and Fairfield Counties and consists primarily of ***Rocky Creek*** and its tributaries. The watershed occupies 127,872 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Wilkes-Pacolet-Cecil-Madison series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 10%, with a range of 2-40%. Land use/land cover in the watershed includes: 79.8% forested land, 10.0% agricultural land, 7.9% scrub/shrub land, 1.7% urban land, 0.2% barren land, and 0.4% water.

Rocky Creek originates near the Town of Chester and accepts drainage from Grassy Run Branch, Bull Run Creek, Hooper Creek (Melton Branch), Barbers Creek (McDaniels Branch, Waters Branch), and Bull Skin Creek. Further downstream, Beaverdam Creek enters Rocky Creek followed by Little Rocky Creek (Shannon Creek, Bell Creek (Stover Creek), Hodges Branch, and Turkey Branch. Rocky Creek drains into Cedar Creek Reservoir near the Town of Great Falls. There are a total of 260.5 stream miles in this watershed and numerous lakes and ponds (totaling 269.3 acres), all classified FW.

Water Quality

Station #	Type	Class	Description
CW-088	S	FW	GRASSY RUN BRANCH AT SC 72 1.6 MI NE CHESTER
CW-002	P/BIO	FW	ROCKY CREEK AT S-12-335 3.5 MI E OF CHESTER
CW-067	BIO	FW	LITTLE ROCKY CREEK AT S-12-144
CW-691	BIO	FW	BEAVERDAM CREEK AT S-12-555
CW-236	W	FW	ROCKY CREEK AT S-12-138
CW-175	S	FW	ROCKY CREEK AT S-12-141 SE OF GREAT FALLS

Rocky Creek - There are three monitoring sites along Rocky Creek. At the upstream site ***(CW-002)***, aquatic life uses are partially supported based on macroinvertebrate community data, compounded by a significant decreasing trend in dissolved oxygen concentrations, a significant increasing trend in total nitrogen, and a very high concentration of zinc measured in 1995. There is also a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations.

Aquatic life uses are fully supported at the next site downstream ***(CW-236)***, but recreational uses are not supported due to fecal coliform bacteria excursions. Aquatic life uses are also fully supported at the downstream site ***(CW-175)***. There is a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions.

Grassy Run Branch (CW-088) - Aquatic life uses are not supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen concentrations. Significant decreasing

trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Beaverdam Creek (CW-691) - Aquatic life uses are partially supported based on macroinvertebrate community data.

Little Rocky Creek (CW-067) - Aquatic life uses are fully supported based on macroinvertebrate community data.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION***
COMMENT	
ROCKY CREEK	SC0036056
CITY OF CHESTER/ROCKY CREEK PLT	MAJOR DOMESTIC
PIPE #: 001 FLOW: 1.36	WATER QUALITY
PIPE #: 001 FLOW: 2.0 (PROPOSED)	WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO	
ROCKY CREEK	SCG250041
SPRINGS IND./KATHERINE PLANT	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	EFFLUENT
ROCKY CREEK TRIBUTARY	SC0040941
ESSEX GROUP, INC.	MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.0091	EFFLUENT
ROCKY CREEK TRIBUTARY	SCG250044
WILLAMETTE INDUSTRIES/CHESTER DIV.	MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.015	EFFLUENT
GRASSY RUN BRANCH	SCG250138
SPRINGS IND./EUREKA PLANT	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	EFFLUENT
GRASSY RUN BRANCH	SCG250038
BORDEN INC./CHESTER PLANT	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	EFFLUENT

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
WILLAMETTE INDUSTRIES INDUSTRIAL	123301-1601 (IWP-188) ACTIVE
CHESTER COUNTY C&D LANDFILL CONSTRUCTION	121001-1101 (DWP-081) CLOSED
CHESTER COUNTY C&D LANDFILL CONSTRUCTION	121003-1201 ACTIVE
CHESTER COUNTY TRANSFER STA. MUNICIPAL	121001-6001 --------

Growth Potential

This watershed contains portions of the Towns of Richburg and Great Falls, and the City of Chester. Growth extends north and east of Chester, along York Road and S.C. 72. Industrial, residential, and commercial growth has occurred in the Richburg area, associated with the I-77/S.C.9 interchange and the presence of utilities in that area. Water service is available in the Chester area, along S.C. Hwy. 9 through Richburg, and down S.C. Hwy. 99 to Great Falls. Sewer service exists in the Chester and Richburg areas. The presence of I-77 will have an impact on future growth in the watershed, especially the Richburg area. Another important transportation artery is S.C. Hwy. 9, portions of which are currently being widened to four lanes. The remainder of the watershed is rural and should see scattered development in the future.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL for fecal coliform has been developed by SCDHEC and approved by EPA for **Grassy Run Branch** water quality monitoring site CW-088. The TMDL states that an 86% reduction in fecal coliform loading from urban areas is necessary for the stream to meet the recreational use standard. Implementation of this nonpoint source TMDL will include the use of voluntary best management practices (BMPs) and other measures. Grant funding through SCDHEC may be available to aid in BMP implementation.

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using the WARMF model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North

Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050104-010

(Wateree River/Lake Wateree)

General Description

Watershed 03050104-010 is located in Fairfield and Kershaw Counties and consists primarily of the ***Wateree River*** and its tributaries as it flows through Lake Wateree. The watershed occupies 208,729 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Wilkes-Wateree-Rion-Madison series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 17%, with a range of 2-45%. Land use/land cover in the watershed includes: 85.9% forested land, 6.3% water, 3.5% scrub/shrub land, 2.2% agricultural land, 1.3% forested wetland, 0.7% urban land, and 0.1% barren land.

The Catawba River flows out of the Cedar Creek Dam and is joined by Cedar Creek (Bell Branch, Rocky Creek, Gar Creek), McDowell Creek, Crooked Creek, and the Big Wateree Creek watershed (03050104-020) to form the headwaters of the Wateree River and Lake Wateree. Duke Power Company oversees operation of Lake Wateree, which is used for power generation, water supply, and recreational purposes. Little Wateree Creek originates near the Town of Winnsboro and accepts drainage from Horse Creek, McCulley Creek, Ready Creek, Minton Creek (White Oak Branch), and Horse Branch before flowing into the Big Wateree Creek embayment. Langley Branch enters the lake just downstream of the confluence, and Taylor Creek and Dutchmans Creek (Cedar Fork, Lots Fork) form arms of the lake near Lake Wateree State Park. Moving downlake, streams draining into the lake include: Singleton Creek (McDow Creek, Rocky Branch), Rochelle Creek, June Creek, Fox Creek, Beaver Creek (Tranham Creek, Showerbath Branch, Little Beaver Creek), Stillhouse Branch, Colonel Creek, and White Oak Creek. There are a total of 409.8 stream miles and 11,855.5 acres of lake waters in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-231	W	FW	CATAWBA R. 50 YDS DOWNSTREAM OF CEDAR CK CONFLUENCE
CW-040	S	FW	LITTLE WATEREE CREEK AT S-20-41 5 MI E OF WINNSBORO
CW-692	BIO	FW	DUTCHMANS CREEK AT S-20-21
CW-076	BIO	FW	BEAVER CREEK AT S-28-13
CW-208	P	FW	LAKE WATEREE, DUTCHMANS CREEK ARM AT S-20-101
CW-207	P	FW	LAKE WATEREE AT END OF S-20-291
CW-693	BIO	FW	WHITE OAK CREEK AT S-28-696
CW-209	P	FW	LAKE WATEREE AT SMALL ISLAND 2.3 MI N OF DAM

Catawba River (CW-231) - Aquatic life uses are fully supported; however there was a high concentration of chromium measured in 1998. Recreational uses are fully supported.

Lake Wateree - Lake Wateree has a watershed covering 863.2 km² (up to the Cedar Creek Reservoir Dam), a surface area of 5548.4 hectares, and a maximum and mean depth of 19.5m and 6.9m, respectively. Lake

Wateree has an average annual retention time of 27 days. The lake was treated annually from 1994 to 1996 with aquatic herbicides in an attempt to control the growth of aquatic macrophytes near a public boat ramp. The problem has been controlled and no further treatments were necessary.

There are three monitoring sites on Lake Wateree and recreational uses are fully supported at all sites. In the Dutchmans Creek arm of the lake ***(CW-208)***, aquatic life uses are partially supported due to pH excursions. This is compounded by a significant decreasing trend in dissolved oxygen concentrations and significant increasing trends in turbidity, total phosphorus concentrations, and total suspended solids concentrations. In addition, elevated phosphorus and algae concentrations indicate adverse impacts to aquatic life due to eutrophication. In sediments, a very high concentration of cadmium was measured in the 1998 sample. Also in sediment, a very high concentration of chromium was measured in the 1998 sample and high concentrations of chromium were measured in the 1994, 1996, and 1997 samples. Very high concentrations of copper were measured in the 1997 and 1998 samples, and high concentrations were measured in the 1994-1996 sediment samples and a high concentration of lead was measured in the 1997 sample. Nickel concentrations were very high in the 1997 and 1998 sediment samples, and high in the 1994 and 1996 samples. Zinc concentrations in sediment were very high in the 1996-1998 samples, and high in the 1994 and 1995 samples. P,P'DDE (a metabolite of DDT) was detected in the 1995 and 1998 sediment samples. Although the use of DDT was banned in 1973, it is very persistent in the environment.

Further downlake ***(CW-207)***, aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentrations and significant increasing trends in turbidity and total suspended solids concentrations. In addition, elevated phosphorus and algae concentrations indicate adverse impacts to aquatic life due to eutrophication. In sediments, a very high concentration of cadmium was measured in the 1998 sample. Also in sediment, very high concentrations of chromium were measured in the 1994, 1997, and 1998 samples and high concentrations of chromium were measured in the 1995 and 1996 samples. Very high concentrations of copper and zinc were measured in the 1994, 1996, 1997, and 1998 sediment samples, and a high concentration of copper and zinc were measured in the 1995 sample. Lead concentration was very high in the 1994 sediment sample and high in the 1996 and 1997 samples. Nickel concentrations were very high in the 1994, 1997, and 1998 sediment samples, and high in the 1996 sample. P,P'DDE was detected in the 1994, 1995, and 1998 samples, and the pesticide malathion was detected in the 1994 sediment sample.

At the furthest downlake site ***(CW-209)***, aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentrations and a significant increasing trend in turbidity. In addition, elevated phosphorus and algae concentrations indicate adverse impacts to aquatic life due to eutrophication. There is also a significant decreasing trend in pH. In sediments, a very high concentration of cadmium was measured in the 1998 sample. Also in sediment, very high concentrations of chromium were measured in all five annual sediment samples: 1994-1998. Very high concentrations of copper were measured in the 1994, and 1996-1998 samples, and a high concentration was measured in the 1995 sediment sample. Lead concentrations were very high in the 1994 and 1995 sediment samples and high in the 1996 and 1997 samples. Nickel concentrations were very high in the 1994, 1995, 1997, and 1998 sediment samples, and high in the 1996 sample. Zinc concentrations in sediment were very high in the 1994-1996, and 1998

samples, and high in the 1997 sample. P,P'DDE was detected in the 1994, 1995, and 1998 samples, and malathion was detected in the 1994 sediment sample.

Little Wateree Creek (CW-040) - Aquatic life uses are partially supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen concentrations. Recreational uses are partially supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Dutchman Creek (CW-692) - Aquatic life uses are fully supported based on macroinvertebrate community data.

Beaver Creek (CW-076) - Aquatic life uses are fully supported based on macroinvertebrate community data.

White Oak Creek (CW-693) - Aquatic life uses are fully supported based on macroinvertebrate community data.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
LAKE WATEREE NOSOCA PINES RANCH PIPE #: 001 FLOW: .025	SC0033651 MINOR DOMESTIC EFFLUENT
LAKE WATEREE JONES & FRANK WATEREE STATE PARK PIPE #: 001 FLOW: M/R (INACTIVATED 9/20/99)	SC0042048 MINOR INDUSTRIAL EFFLUENT
LAKE WATEREE US AIR FORCE/WATEREE RECREATION PIPE #: 001 FLOW: 0.01	SC0044440 MINOR INDUSTRIAL EFFLUENT
MCCULLY CREEK WINNSBORO/WTP PIPE #: 001 FLOW: 0.01	SCG645027 MINOR DOMESTIC EFFLUENT
READY CREEK RICHARD WINN ACADEMY PIPE #: 001 FLOW: .00375 (INACTIVATED 9/1/99)	SC0028134 MINOR DOMESTIC WQL FOR NH3-N, TRC, DO

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE *RECEIVING STREAM*		*PERMIT #* *STATUS*
LAKE WATEREE STATE PARK/FAMILY LAKE WATEREE		20-307-0010 ACTIVE
LAKE WATEREE CAMPGROUND/FAMILY LAKE WATEREE		28-307-8502 ACTIVE
NOSOCA PINE RANCH/RESIDENT LAKE WATEREE		28-305-8500 ACTIVE

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
FAIRFIELD COUNTY DR. FLOYD PIT	0332-39 SAND
FAIRFIELD COUNTY CARLISLE PIT	0336-39 SAND
FAIRFIELD COUNTY ROCHELLE MINE	0848-39 CLAY
GRANITE PANELWALL COMPANY CAROLINA DIAMOND GRAY QUARRY	0012-55 GRANITE
GEORGIA STONE, INC. SOUTH CAROLINA GRANITE MINE	0556-55 GRANITE
CAROLINA QUARRIES CONGAREE QUARRY	0405-57 GRANITE

Groundwater Contamination

The groundwater located in the area of the aboveground storage tanks owned by Winnsboro Petroleum Company (#13768) is contaminated with petroleum products as a result of spills/leaks. The facility is in the assessment phase. The surface water affected by the groundwater contamination is McCulley Creek, and samples are to be collected.

Water Supply

WATER USER (TYPE) *STREAM*		*REGULATED CAPACITY (MGD)* *PUMPING CAPACITY (MGD)*
LUGOFF-ELGIN WATER AUTH. (M) LAKE WATEREE		5.2 7.8

CITY OF CAMDEN (M)	6.0
LAKE WATEREE	------

Growth Potential

There is a moderate to high potential for continued residential and commercial development adjacent to Lake Wateree and the Town of Winnsboro. Public water is available along S.C. Hwy. 34, which runs between the Towns of Winnsboro and Ridgeway, and plans are being developed to extend public sewer along this corridor.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

SCDHEC has contracted with the University of South Carolina to quantify relationships between land use and water quality in the Catawba River Basin. The project will evaluate these relationships using a watershed model, which will be used to develop a TMDL for total phosphorus in Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree. The TMDL is being developed in cooperation with the North Carolina Division of Water Quality and will involve stakeholders in the basin. Additional information about the TMDL development process can be found in Appendix B.

03050104-020

(Big Wateree Creek)

General Description

Watershed 03050104-020 is located in Fairfield County and consists primarily of ***Big Wateree Creek*** and its tributaries. The watershed occupies 37,437 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Wilkes-Winnsboro series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 15%, with a range of 2-40%. Land use/land cover in the watershed includes: 87.4% forested land, 6.6% agricultural land, 4.5% scrub/shrub land, 0.8% urban land, 0.5% water, and 0.2% barren land.

Big Wateree Creek accepts the drainage of Wall Creek, Willow Swamp Branch, Gaydens Creek, Scabber Branch, and Hogfork Branch before forming an arm of Lake Wateree. There are numerous lakes and ponds (totaling 88.6 acres) in the watershed used for recreation and flood control and a total of 93.0 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-072	W	FW	BIG WATEREE CREEK AT US 21

Big Wateree Creek (CW-072) - Although there was a dissolved oxygen excursion, due to the small sample size, aquatic life use support determination is inconclusive. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION (EL/WQL)*
BIG WATEREE CREEK WHITE OAK CONFERENCE CENTER PIPE #: 001 FLOW: 0.06 WQL FOR BOD_5, NH3-N, TRC, DO	SC0035980 MINOR DOMESTIC WATER QUALITY

Growth Potential

There is a low potential for growth in this rural watershed. I-77 and S.C. Hwy. 200 cross near the center of the watershed and some commercial/industrial growth may occur around the intersection. The only water and sewer service is available along S.C. Hwy. 200 from the Town of Winnsboro to I-77. Another area of minor growth is the Blackstock area north of Winnsboro on U.S. Hwy. 321.

03050104-030

(Wateree River)

General Description

Watershed 03050104-030 is located in Kershaw, Sumter and Richland Counties and consists primarily of the ***Wateree River*** and its tributaries from the Wateree dam to its confluence with the Congaree River. The watershed occupies 223,982 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Lakeland-Chastain-Tawcaw-Vaucluse series. The erodibility of the soil (K) averages 0.22; the slope of the terrain averages 5%, with a range of 0-25%. Land use/land cover in the watershed includes: 49.5% forested land, 20.0% forested wetland (swamp), 13.5% agricultural land, 9.9% scrub/shrub land, 3.5% urban land, 3.1% water, 0.4% nonforested wetland (marsh), and 0.1% barren land.

Downstream from the Wateree Dam, the Wateree River accepts drainage from Grannies Quarter Creek watershed (03050104-040), Sawneys Creek watershed (03050104-050), Rocky Branch, and Sanders Creek (Gum Swamp Creek). There are several ponds and lakes along the Sanders Creek drainage that include Vaughs Mill Pond (20 acres), Colonial Lake (120 acres), and Lake Shamokin (18 acres). Camp Creek enters the river downstream near the City of Camden, as does the Twentyfive Mile Creek watershed (03050104-060), Gillies Creek (Buck Creek), Big Pine Tree Creek watershed (03050104-070), Town Creek, and Gillies Ditch (Jumping Gully). Further downstream, the Swift Creek watershed (03050104-080) enters the river followed by Rafting Creek (Ellerbee Mill Pond, Bracey Mill Creek, Little Rafting Creek, Dinkins Mill Pond), the Spears Creek watershed (03050104-090), Pigeon Roost Branch, Gum Swamp Branch (Robert Branch), and the Colonels Creek watershed (03050104-100). Gum Swamp Branch flows through several oxbow lakes that include Ruggs Lake, Big Lake, Little Lake, and Dry Swamp Lake. The Wateree River flows past the Town of Eastover and just prior to its confluence with the Congaree River, Little River (Beech Creek, Halfway Creek, Campbell Creek, Shanks Creek, Sandy Creek, Fullers Earth Creek) drains into the Wateree River. Kohlers Old River connects Halfway Creek to the river. Additional natural resources include the Manchester State Forest and Poinsett State Park located in the lower portion of the watershed. Poinsett State Park Lake (10 acres) is located on Shanks Creek. There are numerous ponds and lakes in this watershed (totaling 741.8 acres) that are used for municipal, recreational, irrigational, industrial, and water supply purposes and a total of 448.8 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-019	S	FW	WATEREE RIVER AT US 1
CW-206	P	FW	WATEREE RIVER AT US 76 & 378
CW-222	P	FW	WATEREE RIVER 1.6 MI UPSTREAM CONFL.WITH CONGAREE
SC-002	SC	FW	WATEREE RIVER 1.6 MI UPSTREAM CONFL.WITH CONGAREE

A fish consumption advisory has been issued by the Department for mercury and includes portions of this watershed (see p.35).

Wateree River - There are three SCDHEC ambient monitoring network sites along the Wateree River. In addition, the South Carolina Public Service Authority (SCPSA) collects samples at one of the same locations. At the upstream site ***(CW-019)***, aquatic life uses are partially supported due to dissolved oxygen excursions. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. P,P'DDD and P,P'DDE (metabolites of DDT) were detected in the 1998 sediment sample. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are partially supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations.

Aquatic life uses are fully supported further downstream ***(CW-206)***; however there was a very high concentration of zinc measured in 1996. There is a significant decreasing trend in pH. A significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter. Recreational uses are fully supported.

The furthest downstream location is sampled by both SCDHEC ***(CW-222)*** and SCPSA ***(SC-002)***. Aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute standards, including a high concentration measured in 1995 and a very high concentration of lead measured in 1998. In addition, there was a significant increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. A high concentration of nickel was measured in the 1995 sediment sample. Recreational uses are fully supported.

Poinsett State Park Lake - The lake was treated with aquatic herbicides in 1994 and 1996 to control aquatic plants and provide access for fishing, swimming, and boating. The treatments were successful and no further applications were necessary.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
WATEREE RIVER SCE&G/WATEREE STATION PIPE #: 001 FLOW: 490 PIPE #: 002,003A,003B FLOW: M/R	SC0002038 MAJOR INDUSTRIAL EFFLUENT
WATEREE RIVER EI DUPONT/MAY PLANT PIPE #: 001 FLOW: 4.200 PIPE #: 002 FLOW: 0.012	SC0002585 MAJOR INDUSTRIAL WQL FOR BOD5, DO WQL FOR BOD5, DO
WATEREE RIVER ARCHIMICA, INC. (NIPA /HARDWICK CHEMICAL) PIPE #: 003 FLOW: 0.800 WQL FOR BOD5, DO	SC0002682 MAJOR INDUSTRIAL WATER QUALITY

WATEREE RIVER CITY OF CAMDEN WWTP PIPE #: 001 FLOW: 2.4 PIPE #: 001 FLOW: 3.0 (PROPOSED) WQL FOR BOD5, DO	SC0021032 MAJOR DOMESTIC WATER QUALITY
WATEREE RIVER INTERNATIONAL PAPER/EASTOVER (UNION CAMP) PIPE #: 001,01A FLOW: M/R	SC0038121 MAJOR INDUSTRIAL EFFLUENT
WATEREE RIVER KERSHAW CO./LUGOFF WWTP PIPE #: 001 FLOW: 0.72 WQL FOR BOD5, DO	SC0039870 MINOR DOMESTIC WATER QUALITY
WATEREE RIVER WATEREE TEXTILES CORP. PIPE #: 002 FLOW: 1.075 WQL FOR BOD5, DO	SC0023264 MAJOR INDUSTRIAL WATER QUALITY
WATEREE RIVER HURON TECH CORP. PIPE #: 001,002 FLOW: 0.22	SC0047902 MINOR INDUSTRIAL EFFLUENT
WATEREE RIVER EASTOVER/RICHLAND COUNTY. REG. WWTP PIPE #: 001 FLOW: 0.75 (PROPOSED) PIPE #: 001 FLOW:2.5 (PROPOSED)	SC0047911 MINOR DOMESTIC EFFLUENT EFFLUENT
WATEREE RIVER PALMETTO UTILITIES INC. REG. WWTP PIPE #: 001 FLOW: 6.000 (PROPOSED) WQL FOR BOD5, DO	SC0043451 MINOR DOMESTIC WATER QUALITY
WATEREE RIVER CITY OF SUMTER PIPE #: 001 FLOW: 9.000 (PROPOSED) WQL FOR BOD5, DO	SC0027707 MAJOR DOMESTIC WATER QUALITY
WATEREE RIVER SC DEPT CORR./WATEREE PIPE #: 001 FLOW: 0.250	SC0045349 MINOR DOMESTIC EFFLUENT
GILLIES DITCH WATEREE TEXTILES CORP. PIPE #: 001 FLOW: 0.45 PIPE #: 001 FLOW: 0.50	SC0023264 MAJOR INDUSTRIAL WQL FOR BOD_5, TRC, DO (SUMMER) WQL FOR BOD_5, TRC, DO,NH3-N (WINTER)
GILLIES CREEK UNIMIN CORP./LUGOFF PLT PIPE #: 001,01A,002,02A,003 FLOW: M/R	SC0002909 MINOR INDUSTRIAL EFFLUENT
GILLIES CREEK COGSDILL TOOL PRODUCTS PIPE #: 001 FLOW: M/R	SC0037575 MINOR INDUSTRIAL EFFLUENT
GILLIES CREEK	SCG730188

EASTERN LAND & TIMBER/IND. PK. MN. — MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R — EFFLUENT

GUM SWAMP BRANCH — SC0039292
BECKER HANSON AGGREG./HASSKAMP PLT — MINOR INDUSTRIAL
PIPE #: 001,002 FLOW: M/R — EFFLUENT

RAFTING CREEK — SCG730041
BECKER HANSON AGGREG./HORATIO MINE — MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R — EFFLUENT

LITTLE RAFTING CREEK — SC0031895
SCENIC LAKE PARK — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.010 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

BEECH CREEK — SC0024970
US AIR FORCE/SHAW AFB — MINOR INDUSTRIAL
PIPE #: 01A,01B FLOW: M/R — WATER QUALITY
PIPE #: 001 FLOW: 1.20 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

BEECH CREEK — SC0027707
CITY OF SUMTER (PROPOSED) — MAJOR DOMESTIC
PIPE #: 001 FLOW: 9.0 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

BEECH CREEK TRIBUTARY — SC0030678
CWS/OAKLAND PLANTATION SD — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.160 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

BEECH CREEK TRIBUTARY — SC0033235
SOUTH FORGE APTS — MINOR DOMESTIC
PIPE #: 001 FLOW: 0.0182 — WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO

SANDERS CREEK TRIBUTARY — SC0047384
NEW SOUTH/CAMDEN — MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R — EFFLUENT

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE — ***PERMIT #***
RECEIVING STREAM — ***STATUS***

POINSETT STATE PARK CAMPGROUND/FAMILY — 43-307-5200
SHANK CREEK — ACTIVE

Mining Activities

MINING COMPANY — ***PERMIT #***
MINE NAME — ***MINERAL***

LUGOFF SAND COMPANY	0121-55
LUGOFF SAND MINE	SAND
JW CONDER EASTERN LAND & TIMBER	0592-55
INDUSTRIAL PARK MINE	SAND
WHIBCO, INC.	0089-55
BLANEY PLANT	SAND
BECKER MINERALS, INC.	0582-85
HARRY HASSKAMP MINE	SAND/GRAVEL
BECKER MINERALS, INC.	0904-85
HORATIO MINE	SAND/GRAVEL

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME	***PERMIT #***
FACILITY TYPE	***STATUS***
INTERNATIONAL PAPER/EASTOVER	IWP-187
INDUSTRIAL	ACTIVE
HAGOOD HERATIO DUMP	---------
----------	CLOSED
PLOWDEN C&D DUMP	---------
----------	---------

Land Application Sites

LAND APPLICATION	***PERMIT #***
FACILITY NAME	***TYPE***
SPRAYFIELD	ND0069868
HERMITAGE FARMS MHP	DOMESTIC
SPRAYFIELD	ND0061735
SMITHS MHP	DOMESTIC
RAPID INFILTRATION BASIN	ND0069655
PRAXAIR, INC.	INDUSTRIAL

Water Supply

WATER USER (TYPE)	***REGULATED CAPACITY (MGD)***
STREAM	***PUMPING CAPACITY (MGD)***
EI DUPONT DENEMOURS (M)	6.0
WATEREE RIVER	9.0
EI DUPONT DENEMOURS (I)	9.07
WATEREE RIVER	-----

INTERNATIONAL PAPER (I)	40.03
WATEREE RIVER	------
WHITEHEAD BROS. BLANEY PLT (I)	7.20
GILLIES CREEK	------

Growth Potential

This watershed contains the City of Camden and the Town of Lugoff, and is adjacent to Shaw Air Force Base. There is a high potential for development around these areas. A large portion of the watershed is river bottom-lands swamp forests, which are heavily forested for timber. The City of Camden is proposing to upgrade the WWTP to 3.0 MGD to serve the growth in the area.

Watershed Protection and Restoration

Special Projects

Water Quality Model of the Upper Wateree River

The Kershaw County Water and Sewer Authority contracted with the U.S. Geological Survey to conduct an extensive modeling study of the upper Wateree River, which was completed in 1999. The study included the characterization of streamflow and water quality in the river and the development of hydrodynamic and water quality computer simulation models. Together, the models are designed to predict water quality, especially dissolved oxygen levels, under various streamflow and loading conditions. The models will cover the Wateree River between U.S. Hwy. 1 and U.S. Hwy. 378. The models will be used by SCDHEC in the development of a TMDL for low dissolved oxygen for the upper Wateree River. Part of the TMDL development process will be the determination of wasteload allocations for NPDES permitted discharges on this stretch of the river.

03050104-040

(Grannies Quarter Creek)

General Description

Watershed 03050104-040 is located in Kershaw and Lancaster Counties and consists primarily of ***Grannies Quarter Creek*** and its tributaries. The watershed occupies 45,157 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Goldston-Lakeland-Badin series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 15%, with a range of 0-45%. Land use/land cover in the watershed includes: 86.1% forested land, 8.9% agricultural land, 4.2% scrub/shrub land, 0.7% forested wetland (swamp), 0.1% water.

Grannies Quarter Creek drains into the Wateree River just below the Lake Wateree Dam. Flat Rock Creek (Little Flat Rock Creek) and Dry Branch flow into Grannies Quarter Creek. There are a total of 79.7 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-077	BIO	FW	FLAT ROCK CREEK AT S-28-40
CW-078	BIO	FW	GRANNIES QUARTER CREEK AT S-28-58
CW-237	W	FW	GRANNIES QUARTER CREEK AT SC 97

Flat Rock Creek (CW-077)- Aquatic life uses are fully supported based on macroinvertebrate community data.

Grannies Quarter Creek - There are two monitoring sites along Grannies Quarter Creek. At the upstream site ***(CW-078)***, aquatic life uses are fully supported based on macroinvertebrate community data. At the downstream site ***(CW-237)***, aquatic life uses are also fully supported. Although there was a fecal coliform bacteria excursion, due to the small number of samples, recreational life use support determination is inconclusive.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION***
COMMENT	
GRANNIES QUARTER CREEK	SC0047473
CITY OF CAMDEN WTP `	MINOR DOMESTIC
PIPE #: 001 FLOW: M/R	WATER QUALITY
WQL FOR TRC	

LITTLE FLAT ROCK CREEK CAROLINA QUARRIES/KERSHAW QUARRY PIPE #: 001 FLOW: M/R	SCG730155 MINOR INDUSTRIAL EFFLUENT
LITTLE FLAT ROCK CREEK NC GRANITE CORP./KERSHAW QUARRY PIPE #: 001 FLOW: M/R	SCG730209 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
DESTAG OF MISSOURI CAROLINA MAHOGANY #1	0013-55 GRANITE
GRANITE PANELWALL COMPANY CAROLINA MAHOGANY #2	0014-55 GRANITE
CAROLINA QUARRIES KERSHAW QUARRY	0404-55 GRANITE
N.C. GRANITE CORP. PALMETTO QUARRIES #1	0487-55 GRANITE

Growth Potential

There is a low potential for growth in this watershed. U.S. Highways 521 and 601 run through the area and limited growth is expected adjacent to these roads.

03050104-050

(Sawneys Creek)

General Description

Watershed 03050104-050 is located in Fairfield and Kershaw Counties and consists primarily of ***Sawneys Creek*** and its tributaries. The watershed occupies 37,224 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Herndon-Georgeville-Tatum-Helena series. The erodibility of the soil (K) averages 0.43; the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 85.8% forested land, 8.6% agricultural land, 0.6% urban land, 4.5% scrub/shrub land, 0.3% forested wetland (swamp), and 0.2% water.

Sawneys Creek originates near the Town of Ridgeway and drains into the Wateree River. Thorntree Creek and Bee Branch drain into Sawneys Creek. There are a few ponds (totaling 36.9 acres) in this watershed and a total of 103.3 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-075	BIO	FW	THORNTREE CREEK AT S-20-258
CW-228	P/BIO	FW	SAWNEYS CREEK AT S-20-151
CW-079	W	FW	SAWNEYS CREEK AT S-28-37

Thorntree Creek (CW-075) - Aquatic life uses are fully supported based on macroinvertebrate community data.

Sawneys Creek - There are two monitoring sites along Sawneys Creek. Aquatic life uses are fully supported at the upstream site ***(CW-228)*** based on macroinvertebrate community data, physical data, and chemical data; however, there was a high concentration of copper measured in 1995. A significant decreasing trend in total phosphorus concentration suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions. At the downstream site ***(CW-079)***, aquatic life uses are fully supported, but recreational uses are partially supported due to fecal coliform bacteria excursions.

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE *RECEIVING STREAM*	*PERMIT #* *STATUS*
CAMP LONGRIDGE/RESIDENT THORNTREE CREEK TRIBUTARY	20-305-1125 ACTIVE

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
KENNECOTT/RIDGEWAY MINING CO. RIDGEWAY MINE	0724-39 GOLD ORE

Land Disposal Activities

Land Application Sites

LAND APPLICATION SYSTEM *FACILITY NAME*	*ND#* *TYPE*
SPRAYFIELD FAIRFIELD NURSING HOME	ND0067008 DOMESTIC

Growth Potential

There is a low potential for growth in this watershed, which contains a portion of the Town of Ridgeway. The only available water service extends along S.C. Hwy. 34 east of Ridgeway to the Ridgeway gold mine, which is scheduled to close.

03050104-060

(Twentyfive Mile Creek)

General Description

Watershed 03050104-060 is located in Richland, Kershaw, and Fairfield Counties and consists primarily of ***Twentyfive Mile Creek*** and its tributaries. The watershed occupies 79,676 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Lakeland-Wagram-Goldston-Alpin-Tatum series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 10%, with a range of 0-45%. Land use/land cover in the watershed includes: 75.7% forested land, 10.7% agricultural land, 6.5% scrub/shrub land, 5.8% urban land, 0.9% water, 0.3% forested wetland (swamp), and 0.1% barren land.

Twentyfive Mile Creek originates near the Town of Blythewood and accepts drainage from Simmons Creek, Ben Hood Branch, Round Top Branch, Rice Creek, Sandy Branch (Bridge Creek, Reedy Branch, Tuppler Branch), Rocky Branch, Flat Branch, and Bear Creek (Donnington Branch). Further downstream, Big Branch enters Twentyfive Mile Creek followed by Yankee Branch, Jim Branch (Spring Branch), Briar Branch, Dodge Branch, Horsepen Creek (Wolfpit Branch), Bell Branch (Rock Branch), Cook Run, Flat Branch, and Beaverdam Branch before draining into the Wateree River. There are a total of 192.5 stream miles in the watershed and numerous ponds and lakes (totaling 508.1 acres) used for recreation and irrigation, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-229	P	FW	BEAR CREEK AT S-40-82
CW-080	S/BIO	FW	TWENTYFIVE MILE CREEK AT S-28-05 3.7 MI W OF CAMDEN

Twentyfive Mile Creek (CW-080) - Aquatic life uses are partially supported based on macroinvertebrate community data and pH excursions. A significant increasing trend in dissolved oxygen concentration suggests improving conditions for this parameter. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Bear Creek (CW-229) - Aquatic life uses are fully supported, however there was a high concentration of zinc measured in 1995. A significant decreasing trend in turbidity suggests improving conditions for this parameter. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
BEAR CREEK TRIBUTARY KENNECOTT/ RIDGEWAY GOLD MINE PIPE #: 003 FLOW: M/R	SC0041378 MINOR INDUSTRIAL EFFLUENT
HORSEPEN CREEK ELGIN ESTATES, INC. PIPE #: 001 FLOW: 0.015 WQL FOR BOD_5, NH3-N, TRC, DO	SC0032395 MINOR DOMESTIC WATER QUALITY
RICE CREEK HOLOX, LTD./BLYTHWOOD PIPE #: 001 FLOW: M/R	SCG250076 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
CAROLINA CERAMICS, INC. KERSHAW #2 CLAY MINE	0138-55 SERICITE
CAROLINA CERAMICS, INC. MOBLEY ROAD MINE	0403-79 SHALE

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
EI DUPONT INDUSTRIAL	283316-1601 (IWP-075, IWP-175, ACTIVE IWP-083)
KERSHAW COUNTY LUGOF/ELGIN MUNICIPAL	DWP-917, DWP-008 ----------
BF GOODRICH (THERMOID) ----------	--------- CLOSED
GULLEDGE COMPOSTING SITE ----------	282443-3001 --------

Land Application Sites

LAND APPLICATION SYSTEM FACILITY NAME	*ND# TYPE*
LAGOON ROCK SPRINGS DEVELOPMENT	ND0067580 DOMESTIC
LAGOON HOLOX, LTD./BLYTHWOOD	ND0069582 INDUSTRIAL

Growth Potential

There is a high potential for continued (rapid) residential, commercial, and industrial growth in this watershed, with an emphasis along the U.S. Hwy. 1 corridor between the Cities of Columbia and Camden. Sewer is provided to this area through a regional system located in Kershaw County.

03050104-070

(Big Pine Tree Creek)

General Description

Watershed 03050104-070 is located in Kershaw County and consists primarily of ***Big Pine Tree Creek*** and its tributaries. The watershed occupies 41,885 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Lakeland-Wagram series. The erodibility of the soil (K) averages 0.10; the slope of the terrain averages 10%, with a range of 0-25%. Land use/land cover in the watershed includes: 65.5% forested land, 14.3% agricultural land, 10.5% urban land, 5.5% scrub/shrub land, 2.3% forested wetland, 1.8% water, and 0.1% barren land.

Big Pine Tree Creek flows through Llewellyn Millpond and accepts drainage from Beaverdam Branch, Thoroughfare Branch, Hyco Branch, and Berkeley Branch before flowing through Adams Mill Pond (160 acres) in N.R. Goodale State Park and Hermitage Mill Pond (600 acres). Thomas Branch drains into Hermitage Millpond, which is used for power generation, industry, water supply, and recreation. Downstream of Hermitage Mill Pond, Little Pine Tree Creek (Kendall Lake) joins Big Pine Tree Creek in the City of Camden and flows into the Wateree River. Kendall Lake (50 acres) is used for municipal and irrigational purposes for the City of Camden. There are a total of 66.0 stream miles and 549.2 acres of lake waters in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-223	S/BIO	FW	LITTLE PINE TREE CREEK AT S-28-132
CL-078	W	FW	ADAMS MILLPOND, FOREBAY EQUIDISTANT DAM TO SHORE
CW-021	W	FW	BIG PINE TREE CREEK AT US 521, NW BRIDGE

Big Pine Tree Creek (CW-021) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are fully supported.

Little Pine Tree Creek (CW-223) - Aquatic life uses are fully supported based on macroinvertebrate community data; however there is a significantly increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand concentration suggests improving conditions for this parameter. Recreational uses are fully supported.

Adams Mill Pond (CL-078) - Adams Mill Pond has a watershed covering 128.7 km², a surface area of 64.8 hectares, and a maximum and mean depth of 4.6m and 1.0m, respectively. The lake has been treated annually for seven years with aquatic herbicides in an attempt to control the growth of aquatic plants and provide access for boating and swimming. No further treatments were necessary after 1995. Aquatic life uses

are fully supported. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are fully supported.

Kendall Lake - The lake was treated with aquatic herbicides in 1994 and 1995 to control aquatic plants and reclaim recreational areas for swimming and boating. The plan included both chemical and biological treatments. The treatments were successful and no further applications were necessary.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
BIG PINE TREE CREEK DEROYAL TEXTILES PIPE #: 001 FLOW: 0.1354	SC0002518 MAJOR INDUSTRIAL EFFLUENT
LITTLE PINE TREE CREEK KENDALL CO./WATEREE PLT. PIPE #: 001,002 FLOW: M/R	SCG250049 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY / ***MINE NAME***	***PERMIT #*** / ***MINERAL***
PALMETTO BRICK COMPANY YOUNG MINE	0629-55 KAOLIN
PALMETTO BRICK COMPANY HINES MINE	0995-55 KAOLIN

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME / ***FACILITY TYPE***	***PERMIT #*** / ***STATUS***
KERSHAW COUNTY LANDFILL MUNICIPAL	281001-1201 (DWP-016, DWP-042) CLOSED
KERSHAW COUNTY LANDFILL MUNICIPAL	281001-1101 (DWP-035) CLOSED
OLD KERSHAW LANDFILL (DUMP) ----------	-------- CLOSED
KENDALL PLANT LANDFILL	IWP-202

INDUSTRIAL	--------
FAIR STREET DUMP ---------	------- CLOSED
DICEY CREEK DUMP ---------	------- CLOSED

Land Application Sites

LAND APPLICATION SYSTEM FACILITY NAME	***ND# TYPE***
SLUDGE APPLICATION DEROYAL TEXTILES WTP	ND0075272 INDUSTRIAL

Growth Potential

There is a high potential for continued residential, commercial, and industrial development in this watershed, which contains a portion of the City of Camden. U.S. Hwy. 1 and U.S. Hwy. 521, together with I-20 provide the growth corridors. The interchange of I-20 and U.S. Hwy. 521 has a particularly high development potential. Sewer is provided to this area through a regional system located in Kershaw County.

03050104-080

(Swift Creek)

General Description

Watershed 03050104-080 is located in Kershaw, Sumter, and Lee Counties and consists primarily of ***Swift Creek*** and its tributaries. The watershed occupies 39,909 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Vaucluse-Pelion-Wagram-Lucy series. The erodibility of the soil (K) averages 0.12; the slope of the terrain averages 7%, with a range of 2-15%. Land use/land cover in the watershed includes: 46.9% forested land, 33.4% agricultural land, 12.6% scrub/shrub land, 5.3% forested wetland (swamp), 1.5% water, 0.2% urban land, and 0.1% nonforested wetland (marsh).

Swift Creek is joined by Little Swift Creek and flows through Boykins Mill Pond (200 acres) and White Oak Slash Lake (120-acres) before draining into the Wateree River. The ponds are used for water supply, irrigation, and recreation. There are a total of 68.4 stream miles and 335.8 acres of lake waters in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-238	W	FW	SWIFT CREEK AT SC 261

Swift Creek (CW-238) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low pH and dissolved oxygen conditions. Although pH and dissolved oxygen excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are fully supported.

Nonpoint Source Management Program

Mining Activities

MINING COMPANY / *MINE NAME*	*PERMIT #* / *MINERAL*
SC DEPT OF CORR.	0091-85
CAMDEN (HAGOOD) PLANT	SAND/GRAVEL

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME / *FACILITY TYPE*	*PERMIT #* / *STATUS*
WATEREE CORR. INST.	--------
---------	CLOSED

Growth Potential

There is a low potential for growth in this watershed.

03050104-090

(Spears Creek)

General Description

Watershed 03050104-090 is located in Kershaw and Richland Counties and consists primarily of ***Spears Creek*** and its tributaries. The watershed occupies 45,242 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Lakeland-Wagram-Chastain-Chewacla series. The erodibility of the soil (K) averages 0.28; the slope of the terrain averages 7%, with a range of 0-25%. Land use/land cover in the watershed includes: 68.8% forested land, 9.5% forested wetland, 9.1% agricultural land, 7.0% scrub/shrub land, 4.4% urban land,1.1% water, and 0.1% barren land.

Spears Creek originates near the Town of Elgin and flows past Fort Jackson U.S. Army Base before draining into the Wateree River. Spears Creek flows through several small lakes including an unnamed 85-acre lake before accepting the drainage of Sloan Branch, Kelly Creek (White Pond), Haig Creek, McCaskill Creek (Runander Branch, Otterslide Branch), and Raglins Creek. Further downstream Madraw Branch and Moke Branch enter Spears Creek near its confluence with the Wateree River. There are several lakes and ponds (totaling 391.4 acres) and a total of 78.8 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-154	S/BIO	FW	KELLY CREEK AT S-28-367 2.9 MI SE OF ELGIN
CW-155	P/BIO	FW	SPEARS CREEK AT SC 12 3.6 MI SE OF ELGIN
CW-166	W	FW	SPEARS CREEK AT US 601

Spears Creek - There are two monitoring sites along Spears Creek. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred at both sites, they were typical of values seen in blackwater systems and were considered natural, not standards violations. At the upstream site ***(CW-155)***, aquatic life uses are fully supported based on macroinvertebrate community data and natural conditions. There were significant increasing trends in pH, total nitrogen concentrations, and turbidity. A significant increasing trend in dissolved oxygen concentration suggests improving conditions for this parameter. Recreational uses are fully supported. At the downstream site ***(CW-166)***, aquatic life uses are also fully supported based on natural conditions. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

Kelly Creek (CW-154) - This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Aquatic life uses are fully supported based on macroinvertebrate data and natural conditions. There is also a significant increasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total phosphorus concentrations suggest improving conditions for these parameters. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
SPEARS CREEK PALMETTO UTILS./ VALHALLA WWTP PIPE #: 001 FLOW: 0.355 WQL FOR TRC, DO, NH_3-N, BOD_5	SC0043494 MINOR DOMESTIC WATER QUALITY
SPEARS CREEK TRIBUTARY KROGER CO./PONTIAC FOODS PIPE #: 001 FLOW: M/R	SCG250053 MINOR INDUSTRIAL EFFLUENT
KELLY CREEK ARCHIMICA, INC. (NIPA/ HARDWICK CHEMICAL) PIPE #: 002 FLOW: M/R	SC0002682 MAJOR INDUSTRIAL EFFLUENT
SLOAN BRANCH LOVELESS & LOVELESS, INC. PIPE #: 001 FLOW: M/R	SCG730047 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
CAROLINA CERAMICS, INC. KOON CLAY MINE	0137-55 KAOLIN
TAYLOR CLAY PRODUCTS CO. DUNCAN LAKES MINE	0198-55 KAOLIN
TAYLOR CLAY PRODUCTS CO. TAYLOR MINE	0830-55 KAOLIN
RICHTEX CORP. GADSON PIT	0409-55 KAOLIN
RICHTEX CORP. COLEMAN MINE	0185-79 KAOLIN
LOVELESS & LOVELESS, INC. SCREAMING EAGLE ROAD PIT	0492-55 SAND
HARDAWAY CONCRETE COMPANY, INC. NORTHEAST MINE	0507-79 SAND
CHAMBERS RICHLAND CO. LANDFILL, INC. SCREAMING EAGLE ROAD MINE	0700-79 KAOLIN
TNT SAND	0898-79

TNT SAND MINE	SAND
MILDRED R. PORTER PORTER'S PIT	1115-55 SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
SCREAMING EAGLE RD/CHAMBERS LANDFILL MUNICIPAL	402400-1101 (DWP-126) ACTIVE
SOUTHEASTERN ASSOCIATES MUNICIPAL	322428-1201 ---
CLEMSON ROAD DUMP ---	--- CLOSED
SCREAMING EAGLE ROAD MUNICIPAL	DWP-028, DWP-106 CLOSED
CAROLINA CONTAINER NORTHEAST LANDFILL MUNICIPAL	403323-1101 (DWP-134, IWP-226) CLOSED
CAROLINA CONTAINER NORTHEAST LANDFILL MUNICIPAL	402434-1101 ACTIVE
LOVELESS & LOVELESS, INC. CONSTRUCTION ---	282428-1201

Land Application Sites

LAND APPLICATION SYSTEM ***FACILITY NAME***	***ND#*** ***TYPE***
INFILTRATION BASIN PALMETTO UTILS., INC. REG. WWTP	ND0068411 DOMESTIC
TILE FIELD HACIENDA MOBILE HOME ESTATES	ND0067598 DOMESTIC
SPRAYFIELD HOMELITE/TEXTRON	ND0072818 INDUSTRIAL

Groundwater Contamination

The groundwater in the vicinity of the surface impoundments owned by Archimica Inc. (formerly Hardwicke Chemical) is contaminated with volatile organics, due to spills and leaks (#00204). The surface water affected is Kelly Creek. Groundwater assessment and remediation plans have been implemented and the facility is under an enforcement action. Also affecting a Spears Creek tributary is the groundwater in the vicinity of the surface impoundments owned by Homelite Textron (formerly Townsend Saw Chain), which are contaminated with chromium and volatile organics. This is a U.S. EPA National Priority Pollutant list site

(#SCD980558050) and the facility is in the remediation phase. The facility is located in the Colonels Creek Watershed (03050104-100), but affects Spears Creek in this watershed.

Water Supply

WATER USER (TYPE) *STREAM*	*REGULATED CAPACITY (MGD)* *PUMPING CAPACITY (MGD)*
HARDWICK CHEMICAL CO. (I)	0.70
SPEARS CREEK	------

Growth Potential

There is a moderate to high potential for residential, commercial, and industrial growth in this watershed. I-20 crosses the area, together with U.S. Hwy. 601 and U.S. Hwy. 1, and S.C. Hwy. 12. There are also several large and growing subdivisions, the Richland County Industrial Park, and a privately owned solid waste landfill to add to future growth in the area. Sewer is provided to this area through a regional system located in Kershaw County. Water service is available from the City of Columbia's water system.

03050104-100

(Colonels Creek)

General Description

Watershed 03050104-100 is located in Richland County and consists primarily of ***Colonels Creek*** and its tributaries. The watershed occupies 44,637 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Vaucluse-Ailey-Alpin series. The erodibility of the soil (K) averages 0.12; the slope of the terrain averages 7%, with a range of 2-15%. Land use/land cover in the watershed includes: 87.0% forested land, 5.3% agricultural land, 5.0% forested wetland (swamp), 1.2% water, 0.6% urban land, 0.8% scrub/shrub land, and 0.1% barren land.

Colonels Creek originates near the Town of Pontiac and flows through the Fort Jackson U.S. Army Base property and into the Wateree River. Colonels Creek flows through DuPre Pond (35 acres) and Messers Pond (47 acres), and accepts drainage from Buffalo Creek and Bee Branch on U.S. property. Colonels Creek then accepts drainage from Jumping Run Creek and Leesburg Branch before flowing through Murray Pond (200 acres) and Goodwill Pond (120 acres). There are numerous recreational ponds in the watershed (totaling 340.2 acres) and a total of 62.1 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
CW-240	W	FW	COLONELS CREEK AT US 601

Colonels Creek (CW-240) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low pH. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are fully supported.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION (EL/WQL)*
COLONELS CREEK - DITCH SC NATL GUARD/LEESBURG TRAINING FAC. PIPE #: 001 FLOW: M/R	SC0046108 MINOR INDUSTRIAL EFFLUENT
LEESBURG BRANCH US MARINE CORP. PIPE #: 001 FLOW: M/R	SC0038792 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
CAROLINA GRADING INC. INDUSTRIAL	402446-1601 (IWP-223) ACTIVE

Growth Potential

There is a low potential for growth in this watershed, which contains the eastern portion of Fort Jackson. Percival Road and I-20 run along the top of the watershed, and water and sewer is only available there and near the Leesburg Road/Fort Jackson area. There are some rural residential areas in the Leesburg Road area.

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APPENDIX A.

Catawba River Basin

Ambient Water Quality Monitoring Site Descriptions

Station #	Type	Class	Description
03050101-180			
CW-197	P	FW	LAKE WYLIE ABOVE MILL CREEK ARM AT END OF S-46-557
CW-192	S	FW	SOUTH FORK AT S-46-79 4.5 MI NW OF CLOVER
CW-152	P	FW	CROWDERS CREEK AT US 321 0.5 MI N OF NC STATE LINE
CW-023	P	FW	CROWDERS CREEK AT S-46-564 NE CLOVER
CW-024	W/BIO	FW	CROWDERS CREEK AT S-46-1104
CW-105	S	FW	BROWN CREEK AT UNIMP RD 1.2 MI N OF CLOVER BELOW PLANT
CW-696	BIO	FW	BEAVERDAM CREEK AT S-46-114
CW-153	S	FW	BEAVERDAM CREEK AT S-46-152 8 MI E OF CLOVER
CW-027	S	FW	LAKE WYLIE, CROWDERS CK ARM AT SC 49 AND SC 274
CW-245	W	FW	LAKE WYLIE, CROWDERS CK ARM-1ST PWRLNE UPST MAINPOOL
CW-198	P	FW	LAKE WYLIE, OUTSIDE MOUTH OF CROWDERS CREEK ARM
CW-230	W	FW	LAKE WYLIE AT DAM, UNDER POWERLINES
03050101-190			
CW-171	S	FW	ALLISON CREEK AT US 321 3.1 MI S OF CLOVER
CW-134	S	FW	CALABASH BRANCH AT S-46-414 2.5 MI SE OF CLOVER
CW-694	BIO	FW	ALLISON CREEK AT S-46-114
CW-200	S	FW	LAKE WYLIE, ALLISON CREEK ARM AT SC 274 9 MI NE OF YORK
CW-201	P	FW	LAKE WYLIE, NORTH LAKEWOODS SD AT EBENEZER ACCESS
03050103-010			
CW-221	S	FW	CATAWBA RIVER TRIBUTARY AT HWY. 161 0.4 MI W OF I-77
CW-014	P	FW	CATAWBA RIVER AT US 21
CW-041	P	FW	CATAWBA RIVER AT SC 5 ABOVE BOWATER
CW-016	P	FW	CATAWBA RIVER AT SC 9 AT FORT LAWN
CW-016F	P	FW	FISHING CREEK RESERVOIR 2 MI BELOW CANE CREEK
CW-057	P	FW	FISHING CREEK RES. 75 FT ABOVE DAM NEAR GREAT FALLS
CW-174	S	FW	CATAWBA R. AT UNIMPROVED RD ABOVE JUNCTION W/ROCKY CK
CW-033	W	FW	CEDAR CREEK RESERVOIR 100 METERS NORTH OF DAM
03050103-020			
CW-247	W	FW	SUGAR CREEK AT MECKLENBURG CO ROAD 51 (IN N.C.)
CW-248	W	FW	LITTLE SUGAR CREEK AT US 521 (IN N.C.)
CW-246	W/BIO	FW	SUGAR CREEK UPSTREAM OF CONFLUENCE WITH MCALPINE CK
CW-226	P	FW	MCALPINE CREEK AT US 521 IN NC
CW-064	S/BIO	FW	MCALPINE CREEK AT S-29-64
CW-009	S	FW	STEELE CREEK AT S-46-22 N OF FORT MILL
CW-203	W	FW	STEELE CREEK AT S-46-98
CW-681	BIO	FW	STEELE CREEK AT BY-PASS US 21
CW-011	S	FW	STEELE CREEK AT S-46-270
CW-013	P	FW	SUGAR CREEK AT SC 160 E OF FORT MILL

CW-036	S	FW	SUGAR CREEK AT S-46-36
03050103-030			
CW-176	P	FW	SIXMILE CREEK AT S-29-54
CW-083	S	FW	TWELVEMILE CREEK AT S-29-55 0.3 MI NW OF VAN WYCK
CW-145	W	FW	WAXHAW CREEK AT S-29-29
03050103-040			
CW-185	S	FW	CANE CREEK AT SC 200 5 MI NNE OF LANCASTER
CW-210	BIO	FW	CANE CREEK AT SC 9
CW-151	S	FW	BEAR CREEK AT S-29-362 3.5 MI SE OF LANCASTER
CW-047	S	FW	GILLS CREEK AT US 521 NNW OF LANCASTER
CW-131	S	FW	BEAR CREEK AT S-29-292 1.6 MI W OF LANCASTER
CW-017	S	FW	CANE CREEK AT S-29-50
CW-232	W	FW	RUM CREEK AT S-29-187
03050103-050			
CW-029	P	FW	FISHING CREEK AT SC 49 NE YORK
CW-031	BIO	FW	FISHING CREEK AT SC 161
CW-005	P/BIO	FW	FISHING CREEK AT S-46-347 DOWNSTREAM OF YORK WWTP
CW-225	S/BIO	FW	FISHING CREEK AT S-46-503
03050103-060			
CW-006	S	FW	WILDCAT CREEK AT S-46-650
CW-212	S	FW	TOOLS FORK AT S-46-195 7 MI NW OF ROCK HILL
CW-096	S	FW	WILDCAT CREEK AT S-46-998 9 MI ENE OF MCCONNELLS
CW-224	S	FW	FISHING CREEK AT S-46-163
CW-697	BIO	FW	STONEY FORK AT SC 121 &72
CW-695	BIO	FW	TAYLOR CREEK AT S-46-735
CW-654	BIO	FW	FISHING CREEK AT S-46-655
CW-007	BIO	FW	SOUTH FORK FISHING CREEK AT S-12-50
CW-008	P	FW	FISHING CREEK AT SC 223 NE RICHBURG
CW-233	W	FW	FISHING CREEK AT S-12-77
CL-021	W	FW	LAKE OLIPHANT, FOREBAY EQUIDISTANT FROM DAM & SHORE
03050103-070			
CW-227	S	FW	NEELYS CREEK AT 2-46-997
CW-234	W/BIO	FW	TINKERS CREEK AT S-12-599
03050103-080			
CW-235	W	FW	CAMP CREEK AT SC 97
CW-084	BIO	FW	CAMP CREEK AT S-29-20
03050103-090			
CW-088	S	FW	GRASSY RUN BRANCH AT SC 72 1.6 MI NE CHESTER
CW-002	P/BIO	FW	ROCKY CREEK AT S-12-335 3.5 MI E OF CHESTER

CW-067	BIO	FW	LITTLE ROCKY CREEK AT S-12-144
CW-691	BIO	FW	BEAVERDAM CREEK AT S-12-555
CW-236	W	FW	ROCKY CREEK AT S-12-138
CW-175	S	FW	ROCKY CREEK AT S-12-141 SE OF GREAT FALLS
03050104-010			
CW-231	W	FW	CATAWBA R. 50 YDS DOWNSTREAM OF CEDAR CK CONFLUENCE
CW-040	S	FW	LITTLE WATEREE CREEK AT S-20-41 5 MI E OF WINNSBORO
CW-208	P	FW	LAKE WATEREE, DUTCHMANS CREEK ARM AT S-20-101
CW-692	BIO	FW	DUTCHMANS CREEK AT S-20-21
CW-076	BIO	FW	BEAVER CREEK AT S-28-13
CW-207	P	FW	LAKE WATEREE AT END OF S-20-291
CW-693	BIO	FW	WHITE OAK CREEK AT S-28-696
CW-209	P	FW	LAKE WATEREE AT SMALL ISLAND 2.3 MI N OF DAM
03050104-020			
CW-072	W	FW	BIG WATEREE CREEK AT US 21
03050104-030			
CW-019	S	FW	WATEREE RIVER AT US 1
CW-206	P	FW	WATEREE RIVER AT US 76 & 378
CW-222	P	FW	WATEREE R. 1.6 MI UPSTREAM CONFL. WITH CONGAREE R.
SC-002	SC	FW	WATEREE R. 1.6 MI UPSTREAM CONFL. WITH CONGAREE R.
03050104-040			
CW-077	BIO	FW	FLAT ROCK CREEK AT S-28-40
CW-078	BIO	FW	GRANNIES QUARTER CREEK AT S-28-58
CW-237	W	FW	GRANNIES QUARTER CREEK AT SC 97
03050104-050			
CW-075	BIO	FW	THORNTREE CREEK AT S-20-258
CW-228	P/BIO	FW	SAWNEYS CREEK AT S-20-151
CW-079	W	FW	SAWNEYS CREEK AT S-28-37
03050104-060			
CW-229	P	FW	BEAR CREEK AT S-40-82
CW-080	S/BIO	FW	TWENTYFIVE MILE CREEK AT S-28-05 3.7 MI W OF CAMDEN
03050104-070			
CW-223	S/BIO	FW	LITTLE PINE TREE CREEK AT S-28-132
CW-021	W	FW	BIG PINE TREE CREEK AT US 521, NW BRIDGE
CL-078	W	FW	ADAMS MILLPOND, FOREBAY EQUIDISTANT DAM TO SHORE
03050104-080			
CW-238	W	FW	SWIFT CREEK AT SC 261

03050104-090

CW-154	S/BIO	FW	KELLY CREEK AT S-28-367 2.9 MI SE OF ELGIN
CW-155	P/BIO	FW	SPEARS CREEK AT SC 12 3.6 MI SE OF ELGIN
CW-166	W	FW	SPEARS CREEK AT US 601

03050104-100

CW-240	W	FW	COLONELS CREEK AT US 601

Water Quality Data

Spreadsheet Legend

Station Information:

STATION NUMBER Station ID

TYPE SCDHEC station type code

P = Primary station, sampled monthly all year round

S = Secondary station, sampled monthly May - October

P* = Secondary station upgraded to primary station parameter coverage and sampling frequency for basin study

W = Special watershed station added for the Catawba River Basin study

BIO = Indicates macroinvertebrate community data assessed

WATERBODY NAME Stream or Lake Name

CLASS Stream classification at the point where monitoring station is located

Parameter Abbreviations and Parameter Measurement Units:

DO	Dissolved Oxygen (mg/l)		
BOD	Five-Day Biochemical Oxygen Demand (mg/l)	NH3	Ammonia (mg/l)
pH	pH (SU)	CD	Cadmium (ug/l)
TP	Total Phosphorus (mg/l)	CR	Chromium (ug/l)
TN	Total Nitrogen (mg/l)	CU	Copper (ug/l)
TURB	Turbidity (NTU)	PB	Lead (ug/l)
TSS	Total Suspended Solids (mg/l)	HG	Mercury (ug/l)
BACT	Fecal Coliform Bacteria (#/100 ml)	NI	Nickel (ug/l)
		ZN	Zinc (ug/l)

Statistical Abbreviations:

N For standards compliance, number of surface samples collected between January, 1994 and December, 1998
For trends, number of surface samples collected between January, 1984 and December, 1998

EXC. Number of samples contravening the appropriate standard

% Percentage of samples contravening the appropriate standard

MEAN EXC. Mean of samples which contravened the applied standard

MED For heavy metals with a human health criterion, this is the median of all surface samples between January, 1994 and December, 1998. DL indicates that the median was the detection limit.

MAG Magnitude of any statistically significant trend, average change per year, expressed in parameter measurement units

GEO MEAN Geometric mean of fecal coliform bacteria samples collected between January, 1994 and December, 1998

Key to Trends:

D Statistically significant decreasing trend in parameter concentration

I Statistically significant increasing trend in parameter concentration

* No statistically significant trend

Blank Insufficient data to test for long term trends

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050101190																				
CW-197	P	LAKE WYLIE	FW	64	1	2	4.3	D	201	-0.03	*	166		63	0	0		D	198	-0.03
CW-192	S*	SOUTH FORK CROWDERS CK	FW	27	0	0		*	80		D	79	-0.05	27	0	0		*	80	
CW-152	P	CROWDERS CK	FW	59	0	0		I	140	0.025	*	139		59	0	0		*	140	
CW-023	P	CROWDERS CK	FW	57	2	4	4.2	*	168		D	166	-0.05	58	0	0		*	169	
CW-024	CS/BIO	CROWDERS CK	FW	6	0	0								6	0	0				
CW-105	S	BROWN CK	FW	27	2	7	4.3	I	78	0.22	D	76	-0.25	27	0	0		*	78	
CW-696	BIO	BEAVERDAM CK	FW																	
CW-153	S	BEAVERDAM CK	FW	24	0	0		*	76		D	75	-0.042	24	0	0		D	76	-0.0166
CW-027	S	LAKE WYLIE	FW	25	0	0		*	80		I	78	0.136	25	1	4	8.7	*	80	
CW-245	CS	LAKE WYLIE	FW	10	0	0								10	0	0				
CW-198	P	LAKE WYLIE	FW	67	1	1	4.5	D	201	-0.05	*	169		64	2	3	8.7	*	197	
CW-201	P	LAKE WYLIE	FW	68	1	1	4.8	D	208	-0.037	D	168	-0.041	68	1	1	8.8	*	203	
CW-230	CS	LAKE WYLIE	FW	11	0	0								11	0	0				
03050101200																				
CW-171	S	ALLISON CK	FW	26	0	0		*	78		D	77	-0.05	26	0	0		*	78	
CW-134	S	CALABASH BRANCH	FW	27	0	0		I	79	0.09	D	77	-0.3	27	0	0		*	79	
CW-694	BIO	ALLISON CK	FW																	
CW-200	S	LAKE WYLIE	FW	26	0	0		*	80		D	79	-0.081	26	0	0		D	80	-0.0559
03050103010																				
CW-221	S	CATAWBA RVR TRIB	FW	25	0	0		*	79		*	78		25	0	0		D	79	-0.0369
CW-014	P	CATAWBA RVR	FW	56	3	5	4.5	*	71		*	71		56	0	0		*	71	
CW-041	P	CATAWBA RVR	FW	56	2	4	2.8	*	171		D	168	-0.085	56	0	0		D	171	-0.016
CW-016	P	CATAWBA RVR	FW	65	0	0		*	199		*	166		64	0	0		*	192	
CW-016F	P	LAKE, FISHING CK RESERVOIR	FW	64	0	0		*	194		*	166		64	0	0		*	191	
CW-057	P	LAKE, FISHING CK RESERVOIR	FW	67	1	1	0.6	*	192		*	169		67	2	3	9	*	190	
CW-174	S	CATAWBA RVR	FW	27	1	4	4.5	*	79		D	78	-0.087	27	0	0		D	79	-0.02
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	8	0	0								7	1	14	5.8			

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050103028																				
CW-247	CS	SUGAR CK	FW	7	0	0								7	0	0				
CW-248	CS	LITTLE SUGAR CK	FW	8	0	0								8	0	0				
CW-246	CS/BIO	SUGAR CK	FW	8	0	0								8	0	0				
CW-226	P	MCALPINE CK	FW	59	0	0		*	110		I	104	0.2	59	0	0		D	97	-0.0408
CW-064	S*/BIO	MCALPINE CK	FW	27	1	4	4.8	*	86		*	79		27	0	0		*	86	
CW-009	S*	STEELE CK	FW	27	2	7	2.6	*	86		D	79	-0.081	27	0	0		D	86	-0.02
CW-203	CS	STEELE CK	FW	8	0	0								8	0	0				
CW-681	BIO	STEELE CK	FW																	
CW-011	S*	STEELE CK	FW	26	0	0		*	87		D	80	-0.06	26	0	0		*	87	
CW-013	P	SUGAR CK	FW	58	0	0		I	145	0.14	D	139	-0.144	58	0	0		D	145	-0.018
CW-036	P*	SUGAR CK	FW	30	1	3	4.7	*	60		*	53		30	1	3	5.9	*	60	
03050103038																				
CW-176	P	SIXMILE CK	FW	59	2	3	3.25	*	111		I	110	0.05	59	0	0		D	111	-0.065
CW-083	P*	TWELVEMILE CK	FW	30	0	0		I	89	0.05	D	84	-0.025	30	1	3	4.6	*	89	
CW-145	CS	WAXHAW CK	FW	7	0	0								7	0	0				
03050103042																				
CW-185	S*	CANE CK	FW	28	7	25	3.786	*	82		D	80	-0.06	28	0	0		*	82	
CW-151	S	BEAR CK	FW	28	11	39	3.982	*	75		D	74	-0.066	28	0	0		I	75	0.028
CW-047	S	GILLS CK	FW	29	8	28	3.825	*	83		*	80		28	0	0		I	82	0.014
CW-131	S	BEAR CK	FW	27	3	11	3.9	I	82	0.06	D	80	-0.05	28	0	0		*	82	
CW-210	BIO	CANE CK	FW																	
CW-017	P*	CANE CK	FW	29	17	59	3.047	*	90		*	86		29	1	3	5.9	*	88	
CW-232	CS	RUM CK	FW	8	4	50	2.575							8	0	0				
03050103050																				
CW-029	P	FISHING CK	FW	54	0	0		*	168		D	165	-0.05	54	0	0		*	168	
CW-031	BIO	FISHING CK	FW																	
CW-005	P/BIO	FISHING CK	FW	56	0	0		*	58		*	58		56	0	0		*	58	
CW-225	P*	FISHING CK	FW	29	0	0		*	54		*	54		29	0	0		D	54	-0.05

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050103060																				
CW-006	S*	WILDCAT CK	FW	27	1	4	2.4	*	80		D	79	-0.1	27	0	0		*	80	
CW-212	S	TOOLS FORK	FW	25	0	0		I	80	0.058	D	77	-0.11	25	0	0		D	80	-0.0285
CW-096	S*	WILDCAT CK	FW	29	0	0		I	83	0.06	D	82	-0.18	29	0	0		D	83	-0.025
CW-224	S*	FISHING CK	FW	27	0	0		*	47		*	45		27	0	0		D	47	-0.0767
CW-697	BIO	STONEY FORK CK	FW																	
CW-695	BIO	TAYLORS CK	FW																	
CW-654	BIO	FISHING CK	FW																	
CW-007	BIO	FISHING CK	FW																	
CW-008	P	FISHING CK	FW	56	0	0		*	196		D	166	-0.036	56	0	0		D	169	-0.025
CW-233	CS	FISHING CK	FW	7	0	0								7	0	0				
CL-021	CS	LAKE OLIPHANT	FW	7	0	0								6	1	17	9			
03050103070																				
CW-227	S	NEELYS CK	FW	26	0	0		*	46		*	45		26	0	0		D	46	-0.05
CW-234	CS/BIO	TINKERS CK	FW	8	1	13	2							8	1	13	3.7			
03050103080																				
CW-084	BIO	CAMP CK	FW																	
CW-235	CS	CAMP CK	FW	8	0	0								8	0	0				
03050103090																				
CW-088	S	GRASSY RUN BRANCH	FW	27	11	41	3.782	D	80	-0.17	D	79	-0.15	27	0	0		*	80	
CW-002	P/BIO	ROCKY CK	FW	58	2	3	1.9	D	174	-0.09	D	170	-0.045	58	0	0		D	174	-0.02
CW-067	BIO	LITTLE ROCKY CK	FW																	
CW-691	BIO	BEAVER DAM CK	FW																	
CW-236	CS	ROCKY CK	FW	7	0	0								7	0	0				
CW-175	S	ROCKY CK	FW	27	2	7	4.2	*	81		D	80	-0.08	27	0	0		D	81	-0.025
03050104010																				
CW-231	CS	CATAWBA RVR	FW	10	1	10	4.6							9	0	0				
CW-040	S	LITTLE WATEREE CK	FW	28	6	21	3.933	D	78	-0.05	*	70		28	1	4	5.6	*	78	
CW-692	BIO	DUTCHMAN CK	FW																	
CW-076	BIO	BEAVER CK	FW																	
CW-208	P	LAKE WATEREE	FW	64	0	0		D	191	-0.04	*	163		64	8	13	8.994	*	190	
CW-207	P	LAKE WATEREE	FW	62	0	0		D	193	-0.055	*	164		62	6	10	8.987	*	191	
CW-693	BIO	WHITE OAK CK	FW																	
CW-209	P	LAKE WATEREE	FW	63	2	3	4.575	D	195	-0.075	*	165		63	6	10	8.863	D	194	-0.0285

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050104020																				
CW-072	CS	BIG WATEREE CK	FW	8	1	13	4							8	0	0				
03050104030																				
CW-019	S	WATEREE RVR	FW	29	4	14	4.575	*	79		D	79	-0.05	29	1	3	5	*	78	
CW-214	I*	WATEREE RVR	FW					*	36		D	32	-0.2					*	35	
CW-206	P	WATEREE RVR	FW	58	2	3	4.825	*	172		*	156		58	2	3	5.8	D	172	-0.0166
CW-222	P	WATEREE RVR	FW	53	1	2	4.1	*	168		D	151	-0.016	53	0	0		*	168	
SC-002	SC	WATEREE RIVER	FW	50	0	0								50	0	0				
03050104040																				
CW-077	BIO	FLAT ROCK CK	FW																	
CW-078	BIO	GRANNIES QUARTER CK	FW																	
CW-237	CS	GRANNIES QUARTER CK	FW	8	0	0								8	0	0				
03050104050																				
CW-075	BIO	THORNTREE CK	FW																	
CW-228	P/BIO	SAWNEYS CK	FW	59	0	0		*	92		*	84		59	0	0		*	90	
CW-079	CS	SAWNEYS CK	FW	8	0	0								8	0	0				
03050104060																				
CW-229	P	BEAR CK	FW	58	5	9	2.89	*	86		*	78		58	1	2	8.77	*	84	
CW-080	P*/BIO	TWENTYFIVE MILE CK	FW	29	0	0		I	88	0.05		86		29	6	21	5.778	*	87	
03050104070																				
CW-223	S/BIO	LITTLE PINE TREE CK	FW	29	0	0		*	79		D	78	-0.025	29	3	10	5.823	*	79	
CL-078	CS	LAKE, ADAMS MILLPOND	FW	8	0	0								7	1	14	5.5			
CW-021	CS	BIG PINE TREE CK	FW	9	0	0								9	7	78	5.7			
03050104080																				
CW-238	CS	SWIFT CK	FW	8	3	38	1.9							8	7	88	5.139			
03050104090																				
CW-154	S/BIO	KELLY CK	FW	28	0	0		*	80		D	80	-0.02	28	4	14	5.255	I	80	-0.05
CW-155	P/BIO	SPEARS CK	FW	59	0	0		I	116	0.055	*	115		59	11	19	5.432	I	116	-0.05
CW-166	CS	SPEARS CK	FW	8	0	0								8	4	50	4.78			
03050104100																				
CW-240	CS	COLONELS CK	FW	8	0	0								8	8	100	5.066			

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050101190																		
CW-197	P	LAKE WYLIE	FW	*	73		D	164	-0.0022				I	171	0.1			
CW-192	S*	SOUTH FORK CROWDERS CK	FW	*	34		D	77	-0.0033				D	78	-0.2738			
CW-152	P	CROWDERS CK	FW	*	73		I	133	0.016	I	107	0.22	D	138	-0.275	*	38	
CW-023	P	CROWDERS CK	FW	I	74	0.0158	I	162	0.005	I	159	0.06	*	168		*	37	
CW-024	CS/BIO	CROWDERS CK	FW															
CW-105	S	BROWN CK	FW	*	33		D	76	-0.054				*	77				
CW-696	BIO	BEAVERDAM CK	FW															
CW-153	S	BEAVERDAM CK	FW	*	32		D	72	-0.0065				*	75				
CW-027	S	LAKE WYLIE	FW	*	30		*	73					*	79				
CW-245	CS	LAKE WYLIE	FW															
CW-198	P	LAKE WYLIE	FW	*	73		D	165	-0.0025	*	159		*	172		*	42	
CW-201	P	LAKE WYLIE	FW	*	71		D	160	-0.0024	D	155	-0.01	*	172				
CW-230	CS	LAKE WYLIE	FW															
03050101200																		
CW-171	S	ALLISON CK	FW	D	33	-0.0025	D	76	-0.003				D	75	-0.4			
CW-134	S	CALABASH BRANCH	FW	*	34		D	77	-0.0516				D	79	-0.7154			
CW-694	BIO	ALLISON CK	FW															
CW-200	S	LAKE WYLIE	FW	D	32	-0.0027	D	75	-0.0022				*	78				
03050103010																		
CW-221	S	CATAWBA RVR TRIB	FW	*	30		D	74	-0.005				*	78				
CW-014	P	CATAWBA RVR	FW	*	62		*	62		*	60		*	71				
CW-041	P	CATAWBA RVR	FW	*	66		D	157	-0.008	D	150	-0.035	*	171		*	49	
CW-016	P	CATAWBA RVR	FW	I	71	0.005	D	162	-0.0033	*	161		*	172		D	79	-0.3666
CW-016F	P	LAKE, FISHING CK RESERVOIR	FW	I	72	0.0078	*	164		I	161	0.0128	I	170	0.6363			
CW-057	P	LAKE, FISHING CK RESERVOIR	FW	*	71		D	161	-0.0027	*	161		I	174	0.25			
CW-174	S	CATAWBA RVR	FW	*	31		*	71					*	77				
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW															

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050103028																		
CW-247	CS	SUGAR CK	FW															
CW-248	CS	LITTLE SUGAR CK	FW															
CW-246	CS/BIO	SUGAR CK	FW															
CW-226	P	MCALPINE CK	FW	I	70	0.0825	I	94	0.104	*	92		*	103				
CW-064	S*/BIO	MCALPINE CK	FW	*	32		*	76					*	81				
CW-009	S*	STEELE CK	FW	*	32		*	75					*	80				
CW-203	CS	STEELE CK	FW															
CW-681	BIO	STEELE CK	FW															
CW-011	S*	STEELE CK	FW	*	32		D	75	-0.004				*	82				
CW-013	P	SUGAR CK	FW	I	70	0.105	*	126		*	90		*	138				
CW-036	P*	SUGAR CK	FW	*	40		*	51					*	53				
03050103038																		
CW-176	P	SIXMILE CK	FW	*	70		I	100	0.01	I	97	0.08	*	110				
CW-083	P*	TWELVEMILE CK	FW	*	40		*	84					*	87				
CW-145	CS	WAXHAW CK	FW															
03050103042																		
CW-185	S*	CANE CK	FW	*	34		*	79					*	82				
CW-151	S	BEAR CK	FW	*	37		*	71					D	75	-0.714			
CW-047	S	GILLS CK	FW	*	36		*	81					*	83				
CW-131	S	BEAR CK	FW	*	34		D	77	-0.0025				*	81				
CW-210	BIO	CANE CK	FW															
CW-017	P*	CANE CK	FW	*	41		D	83	-0.015				*	89				
CW-232	CS	RUM CK	FW															
03050103050																		
CW-029	P	FISHING CK	FW	*	70		D	155	-0.0025	D	145	-0.0129	*	165				
CW-031	BIO	FISHING CK	FW															
CW-005	P/BIO	FISHING CK	FW	D	55	-0.0133	D	55	-0.0133	*	53		*	58				
CW-225	P*	FISHING CK	FW	*	39		D	51	-0.008				*	54				

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050103060																		
CW-006	S*	WILDCAT CK	FW				D	74	-0.01				D	79	-0.5			
CW-212	S	TOOLS FORK	FW	I	33	0.017	D	75	-0.02				D	79	-1.5			
CW-096	S*	WILDCAT CK	FW	D	34	-0.01	D	78	-0.015				D	82	-1			
CW-224	S*	FISHING CK	FW	D	33	-0.0118	D	45	-0.01				*	46				
CW-697	BIO	STONEY FORK CK	FW															
CW-695	BIO	TAYLORS CK	FW															
CW-654	BIO	FISHING CK	FW															
CW-007	BIO	FISHING CK	FW															
CW-008	P	FISHING CK	FW	*	72		D	162	-0.004	D	157	-0.01	*	166				
CW-233	CS	FISHING CK	FW															
CL-021	CS	LAKE OLIPHANT	FW															
03050103070																		
CW-227	S	NEELYS CK	FW	*	30		*	41					*	45				
CW-234	CS/BIO	TINKERS CK	FW															
03050103080																		
CW-084	BIO	CAMP CK	FW															
CW-235	CS	CAMP CK	FW															
03050103090																		
CW-088	S	GRASSY RUN BRANCH	FW	*	31		*	75					D	78	-0.225			
CW-002	P/BIO	ROCKY CK	FW	*	72		D	164	-0.01	I	159	0.064	*	166				
CW-067	BIO	LITTLE ROCKY CK	FW															
CW-691	BIO	BEAVER DAM CK	FW															
CW-236	CS	ROCKY CK	FW															
CW-175	S	ROCKY CK	FW	*	32		*	76					*	79				
03050104010																		
CW-231	CS	CATAWBA RVR	FW															
CW-040	S	LITTLE WATEREE CK	FW				D	71	-0.003				*	68				
CW-692	BIO	DUTCHMAN CK	FW															
CW-076	BIO	BEAVER CK	FW															
CW-208	P	LAKE WATEREE	FW	I	75	0.0067	*	168		*	167		I	164	0.4279	I	58	0.6
CW-207	P	LAKE WATEREE	FW	*	75		*	170		*	168		I	166	0.3166	I	60	0.675
CW-693	BIO	WHITE OAK CK	FW															
CW-209	P	LAKE WATEREE	FW	*	75		D	169	-0.001	*	169		I	165	0.1422	*	59	

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050104020																		
CW-072	CS	BIG WATEREE CK	FW															
03050104030																		
CW-019	S	WATEREE RVR	FW	*	32		*	69					*	76				
CW-214	I*	WATEREE RVR	FW															
CW-206	P	WATEREE RVR	FW	*	66		D	156	-0.003	D	155	-0.0225	*	157		*	143	
CW-222	P	WATEREE RVR	FW	*	62		*	150		*	150		I	151	0.5428	*	147	
SC-002	SC	WATEREE RIVER	FW															
03050104040																		
CW-077	BIO	FLAT ROCK CK	FW															
CW-078	BIO	GRANNIES QUARTER CK	FW															
CW-237	CS	GRANNIES QUARTER CK	FW															
03050104050																		
CW-075	BIO	THORNTREE CK	FW															
CW-228	P/BIO	SAWNEYS CK	FW	D	70	-0.0002	D	88	0	*	83		*	87				
CW-079	CS	SAWNEYS CK	FW															
03050104060																		
CW-229	P	BEAR CK	FW	*	64		*	81		*	74		D	81	-0.4			
CW-080	P*/BIO	TWENTYFIVE MILE CK	FW	*	42		D	80	-0.00285				*	84				
03050104070																		
CW-223	S/BIO	LITTLE PINE TREE CK	FW	*	32		D	69	-0.002				I	76	0.0775			
CL-078	CS	LAKE, ADAMS MILLPOND	FW															
CW-021	CS	BIG PINE TREE CK	FW															
03050104080																		
CW-238	CS	SWIFT CK	FW															
03050104090																		
CW-154	S/BIO	KELLY CK	FW	D	33	0	D	71	-0.0022				*	77				
CW-155	P/BIO	SPEARS CK	FW	*	65		D	104	-0.0033	I	64	0.03	I	111	0.2625			
CW-166	CS	SPEARS CK	FW															
03050104100																		
CW-240	CS	COLONELS CK	FW															

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050101190																	
CW-197	P	LAKE WYLIE	FW	8.13	54	0	0		*	168		55	0	19	0	DL	0
CW-192	S*	SOUTH FORK CROWDERS CK	FW	482.5	27	13	48	1181	*	79		6	0	2	0	DL	0
CW-152	P	CROWDERS CK	FW	271.12	59	12	20	1981	D	140	-20	55	0	19	0	DL	0
CW-023	P	CROWDERS CK	FW	420.61	58	19	33	2531	*	169		58	0	18	0	DL	0
CW-024	CS/BIO	CROWDERS CK	FW	311	6	1	17	3200				6	0	2	0	DL	0
CW-105	S	BROWN CK	FW	677.25	27	18	67	1909	*	78							
CW-696	BIO	BEAVERDAM CK	FW														
CW-153	S	BEAVERDAM CK	FW	360.84	24	8	33	1709	*	76		1	0	1	0	DL	0
CW-027	S	LAKE WYLIE	FW	96.22	24	4	17	1703	*	79		1	0	5	0	DL	0
CW-245	CS	LAKE WYLIE	FW	1.32	5	0	0					5	0	3	0	DL	0
CW-198	P	LAKE WYLIE	FW	8.5	56	0	0		*	170		55	0	19	0	DL	0
CW-201	P	LAKE WYLIE	FW	6.75	56	0	0		*	169		53	0	19	0	DL	0
CW-230	CS	LAKE WYLIE	FW	3.64	8	0	0					8	0	3	0	DL	0
03050101200																	
CW-171	S	ALLISON CK	FW	443.9	26	13	50	881	D	78	-17.083						
CW-134	S	CALABASH BRANCH	FW	560.11	27	15	56	1940	*	79							
CW-694	BIO	ALLISON CK	FW														
CW-200	S	LAKE WYLIE	FW	8.21	26	0	0		*	80				1	0	DL	0
03050103010																	
CW-221	S	CATAWBA RVR TRIB	FW	216.77	25	12	48	1641	*	79							
CW-014	P	CATAWBA RVR	FW	61.1	56	4	7	925	*	71		51	0	17	0	DL	0
CW-041	P	CATAWBA RVR	FW	37.53	55	0	0		D	171	-2.5	49	0	16	0	DL	0
CW-016	P	CATAWBA RVR	FW	57.05	56	0	0		*	170		54	0	17	0	DL	0
CW-016F	P	LAKE, FISHING CK RESERVOIR	FW	50.96	56	0	0		*	168		54	0	19	0	DL	0
CW-057	P	LAKE, FISHING CK RESERVOIR	FW	12.53	58	0	0		D	171	-1	54	0	19	0	DL	0
CW-174	S	CATAWBA RVR	FW	75.62	27	3	11	3937	I	78	1.9375						
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	10.38	6	0	0					6	0	2	0	DL	0

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050103028																	
CW-247	CS	SUGAR CK	FW	196.94	7	1	14	510				7	0	3	2	20	67
CW-248	CS	LITTLE SUGAR CK	FW	480.04	8	4	50	2255				7	0	3	0	DL	0
CW-246	CS/BIO	SUGAR CK	FW	888.34	8	6	75	2272				7	0	3	0	DL	0
CW-226	P	MCALPINE CK	FW	542.94	58	32	55	2669	I	110	34.5	53	0	18	0	DL	0
CW-064	S*/BIO	MCALPINE CK	FW	758.89	26	16	62	2759	I	86	40	4	0	1	0	DL	0
CW-009	S*	STEELE CK	FW	523.48	27	13	48	4873	*	86		6	0	2	0	DL	0
CW-203	CS	STEELE CK	FW	682.45	8	4	50	2678				8	0	3	0	DL	0
CW-681	BIO	STEELE CK	FW														
CW-011	S*	STEELE CK	FW	265.58	26	6	23	2508	*	87		5	0	2	0	DL	0
CW-013	P	SUGAR CK	FW	682.59	58	38	66	1737	*	145		52	0	19	0	DL	0
CW-036	P*	SUGAR CK	FW	1016.53	29	21	72	7915	*	60		7	0	3	0	DL	0
03050103038																	
CW-176	P	SIXMILE CK	FW	355.72	58	15	26	4086	*	111		52	0	19	0	DL	0
CW-083	P*	TWELVEMILE CK	FW	514.78	28	14	50	2497	I	87	26.5	6	0	3	0	DL	0
CW-145	CS	WAXHAW CK	FW	380.01	7	3	43	1470				7	0	3	0	DL	0
03050103042																	
CW-185	S*	CANE CK	FW	202.4	28	5	18	850	*	81		6	0	2	0	DL	0
CW-151	S	BEAR CK	FW	196.67	28	10	36	1663	*	75							
CW-047	S	GILLS CK	FW	804.29	28	19	68	2797	*	82							
CW-131	S	BEAR CK	FW	2102.27	27	22	81	50056	I	82	40						
CW-210	BIO	CANE CK	FW														
CW-017	P*	CANE CK	FW	333.33	30	16	53	3094	*	89		7	0	3	0	DL	0
CW-232	CS	RUM CK	FW	138.46	8	1	13	540				8	0	3	0	DL	0
03050103050																	
CW-029	P	FISHING CK	FW	303.44	54	18	33	1072	*	168		51	0	17	0	DL	0
CW-031	BIO	FISHING CK	FW														
CW-005	P/BIO	FISHING CK	FW	270.97	56	14	25	2200	*	58		54	0	18	0	DL	0
CW-225	P*	FISHING CK	FW	531.43	29	17	59	1277	*	54		8	0	3	0	DL	0

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050103060																	
CW-006	S*	WILDCAT CK	FW	758.53	27	22	81	1383	*	80		6	0	2	0	DL	0
CW-212	S	TOOLS FORK	FW	1002.06	25	20	80	460	D	80	-70						
CW-096	S*	WILDCAT CK	FW	374.59	29	9	31	2353	D	83	-15	7	0	3	0	DL	0
CW-224	S*	FISHING CK	FW	530.03	26	13	50	2166	*	46		6	0	2	0	DL	0
CW-697	BIO	STONEY FORK CK	FW														
CW-695	BIO	TAYLORS CK	FW														
CW-654	BIO	FISHING CK	FW														
CW-007	BIO	FISHING CK	FW														
CW-008	P	FISHING CK	FW	211.51	56	14	25	2317	I	167	5	54	0	15	0	DL	0
CW-233	CS	FISHING CK	FW	310.17	7	2	29	2610				7	0	3	0	DL	0
CL-021	CS	LAKE OLIPHANT	FW	12.23	5	0	0					4	0	1	0	DL	0
03050103070																	
CW-227	S	NEELYS CK	FW	212.83	25	5	20	1072	*	45							
CW-234	CS/BIO	TINKERS CK	FW	223	8	2	25	575				7	0	3	0	DL	0
03050103080																	
CW-084	BIO	CAMP CK	FW														
CW-235	CS	CAMP CK	FW	291.07	8	2	25	1150				8	0	3	0	DL	0
03050103090																	
CW-088	S	GRASSY RUN BRANCH	FW	1219.68	27	23	85	2268	D	80	-52.22	1	0	0			
CW-002	P/BIO	ROCKY CK	FW	397.93	58	22	38	4297	I	172	10.826	53	0	14	0	DL	0
CW-067	BIO	LITTLE ROCKY CK	FW														
CW-691	BIO	BEAVER DAM CK	FW														
CW-236	CS	ROCKY CK	FW	298.08	7	2	29	1250				6	0	3	0	DL	0
CW-175	S	ROCKY CK	FW	225.17	27	9	33	2076	*	81							
03050104010																	
CW-231	CS	CATAWBA RVR	FW	32.76	8	0	0					8	0	3	0	DL	0
CW-040	S	LITTLE WATEREE CK	FW	178.42	27	4	15	2125	D	71	-14.7727			1	0	DL	0
CW-692	BIO	DUTCHMAN CK	FW														
CW-076	BIO	BEAVER CK	FW														
CW-208	P	LAKE WATEREE	FW	6.38	56	1	2	940	*	167		54	0	19	0	DL	0
CW-207	P	LAKE WATEREE	FW	6.58	56	0	0		*	170		55	0	20	0	DL	0
CW-693	BIO	WHITE OAK CK	FW														
CW-209	P	LAKE WATEREE	FW	4.94	58	0	0		*	170		54	0	20	0	DL	0

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050104020																	
CW-072	CS	BIG WATEREE CK	FW	475.5	7	2	29	5550				8	0	2	0	DL	0
03050104030																	
CW-019	S	WATEREE RVR	FW	138.84	29	7	24	946	I	79	3.55	2	0	7	0	DL	0
CW-214	I*	WATEREE RVR	FW						*	32							
CW-206	P	WATEREE RVR	FW	41.88	57	1	2	500	*	155		56	0	19	0	DL	0
CW-222	P	WATEREE RVR	FW	49.63	53	2	4	2300	*	150		52	0	39	0	DL	0
SC-002	SC	WATEREE RIVER	FW	28.65	46	0	0					43	0	46	0	DL	0
03050104040																	
CW-077	BIO	FLAT ROCK CK	FW														
CW-078	BIO	GRANNIES QUARTER CK	FW														
CW-237	CS	GRANNIES QUARTER CK	FW	288.87	6	1	17	430				6	0	2	0	DL	0
03050104050																	
CW-075	BIO	THORNTREE CK	FW														
CW-228	P/BIO	SAWNEYS CK	FW	330.96	54	19	35	2063	*	85		55	0	19	0	DL	0
CW-079	CS	SAWNEYS CK	FW	321.83	8	2	25	1100				8	0	2	0	DL	0
03050104060																	
CW-229	P	BEAR CK	FW	213.12	56	14	25	1243	*	82		54	0	18	0	DL	0
CW-080	P*/BIO	TWENTYFIVE MILE CK	FW	263.2	29	7	24	1449	*	87		8	0	2	0	DL	0
03050104070																	
CW-223	S/BIO	LITTLE PINE TREE CK	FW	152.65	29	2	7	2660	*	79							
CL-078	CS	LAKE, ADAMS MILLPOND	FW	20.07	6	0	0					4	0	2	0	DL	0
CW-021	CS	BIG PINE TREE CK	FW	75.64	7	0	0					8	0	3	0	DL	0
03050104080																	
CW-238	CS	SWIFT CK	FW	21.87	8	0	0					8	0	2	0	DL	0
03050104090																	
CW-154	S/BIO	KELLY CK	FW	163.8	28	3	11	3093	*	79							
CW-155	P/BIO	SPEARS CK	FW	94.6	59	4	7	2125	*	115		56	0	19	0	DL	0
CW-166	CS	SPEARS CK	FW	205.7	8	2	25	620				7	0	2	0	DL	0
03050104100																	
CW-240	CS	COLONELS CK	FW	8.97	7	0	0					8	0	2	0	DL	0

Water Quality Summary - Catawba River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	CR N	CR EXC.	CR MED.	CR %	CU N	CU EXC.	CU %	PB N	PB EXC.	PB MED.	PB %	HG N	HG EXC.	HG MED.	HG %
03050101190																		
CW-197	P	LAKE WYLIE	FW	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
CW-192	S*	SOUTH FORK CROWDERS CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-152	P	CROWDERS CK	FW	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
CW-023	P	CROWDERS CK	FW	18	0	DL	0	17	0	0	18	0	DL	0	18	0	DL	0
CW-024	CS/BIO	CROWDERS CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-105	S	BROWN CK	FW															
CW-696	BIO	BEAVERDAM CK	FW															
CW-153	S	BEAVERDAM CK	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0
CW-027	S	LAKE WYLIE	FW	5	0	DL	0	5	1	20	5	0	DL	0	5	0	DL	0
CW-245	CS	LAKE WYLIE	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-198	P	LAKE WYLIE	FW	19	0	DL	0	19	1	5	19	0	DL	0	18	0	DL	0
CW-201	P	LAKE WYLIE	FW	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
CW-230	CS	LAKE WYLIE	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050101200																		
CW-171	S	ALLISON CK	FW															
CW-134	S	CALABASH BRANCH	FW															
CW-694	BIO	ALLISON CK	FW															
CW-200	S	LAKE WYLIE	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0
03050103010																		
CW-221	S	CATAWBA RVR TRIB	FW															
CW-014	P	CATAWBA RVR	FW	17	0	DL	0	17	1	6	17	0	DL	0	17	0	DL	0
CW-041	P	CATAWBA RVR	FW	16	0	DL	0	16	0	0	16	0	DL	0	15	0	DL	0
CW-016	P	CATAWBA RVR	FW	17	0	DL	0	17	1	6	17	0	DL	0	16	0	DL	0
CW-016F	P	LAKE, FISHING CK RESERVOIR	FW	19	0	DL	0	19	1	5	19	0	DL	0	18	0	DL	0
CW-057	P	LAKE, FISHING CK RESERVOIR	FW	19	0	DL	0	19	1	5	19	0	DL	0	18	0	DL	0
CW-174	S	CATAWBA RVR	FW															
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	CR	CR	CR	CR	CU	CU	CU	PB	PB	PB	PB	HG	HG	HG	HG
NUMBER	TYPE		CLASS	N	EXC.	MED.	%	N	EXC.	%	N	EXC.	MED.	%	N	EXC.	MED.	%
03050103028																		
CW-247	CS	SUGAR CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-248	CS	LITTLE SUGAR CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-246	CS/BIO	SUGAR CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-226	P	MCALPINE CK	FW	18	0	DL	0	18	0	0	18	0	DL	0	18	0	DL	0
CW-064	S*/BIO	MCALPINE CK	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0
CW-009	S*	STEELE CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-203	CS	STEELE CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-681	BIO	STEELE CK	FW															
CW-011	S*	STEELE CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-013	P	SUGAR CK	FW	19	3	DL	16	19	2	11	19	0	DL	0	19	0	DL	0
CW-036	P*	SUGAR CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050103038																		
CW-176	P	SIXMILE CK	FW	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
CW-083	P*	TWELVEMILE CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-145	CS	WAXHAW CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050103042																		
CW-185	S*	CANE CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	0	0	DL	0
CW-151	S	BEAR CK	FW															
CW-047	S	GILLS CK	FW															
CW-131	S	BEAR CK	FW															
CW-210	BIO	CANE CK	FW															
CW-017	P*	CANE CK	FW	3	0	DL	0	3	1	33	3	0	DL	0	3	0	DL	0
CW-232	CS	RUM CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050103050																		
CW-029	P	FISHING CK	FW	17	0	DL	0	17	0	0	17	0	DL	0	17	0	DL	0
CW-031	BIO	FISHING CK	FW															
CW-005	P/BIO	FISHING CK	FW	18	0	DL	0	18	1	6	18	0	DL	0	18	0	DL	0
CW-225	P*	FISHING CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	CR	CR	CR	CR	CU	CU	CU	PB	PB	PB	PB	HG	HG	HG	HG
NUMBER	TYPE		CLASS	N	EXC.	MED.	%	N	EXC.	%	N	EXC.	MED.	%	N	EXC.	MED.	%
03050103060																		
CW-006	S*	WILDCAT CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-212	S	TOOLS FORK	FW															
CW-096	S*	WILDCAT CK	FW	3	1	DL	33	3	2	67	3	0	DL	0	3	0	DL	0
CW-224	S*	FISHING CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-697	BIO	STONEY FORK CK	FW															
CW-695	BIO	TAYLORS CK	FW															
CW-654	BIO	FISHING CK	FW															
CW-007	BIO	FISHING CK	FW															
CW-008	P	FISHING CK	FW	15	1	DL	7	15	0	0	15	0	DL	0	15	0	DL	0
CW-233	CS	FISHING CK	FW	3	0	DL	0	3	1	33	3	0	DL	0	3	0	DL	0
CL-021	CS	LAKE OLIPHANT	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0
03050103070																		
CW-227	S	NEELYS CK	FW															
CW-234	CS/BIO	TINKERS CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050103080																		
CW-084	BIO	CAMP CK	FW															
CW-235	CS	CAMP CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050103090																		
CW-088	S	GRASSY RUN BRANCH	FW															
CW-002	P/BIO	ROCKY CK	FW	14	0	DL	0	14	1	7	14	0	DL	0	14	0	DL	0
CW-067	BIO	LITTLE ROCKY CK	FW															
CW-691	BIO	BEAVER DAM CK	FW															
CW-236	CS	ROCKY CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
CW-175	S	ROCKY CK	FW															
03050104010																		
CW-231	CS	CATAWBA RVR	FW	3	1	DL	33	3	0	0	3	0	DL	0	3	0	DL	0
CW-040	S	LITTLE WATEREE CK	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0
CW-692	BIO	DUTCHMAN CK	FW															
CW-076	BIO	BEAVER CK	FW															
CW-208	P	LAKE WATEREE	FW	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
CW-207	P	LAKE WATEREE	FW	20	0	DL	0	19	1	5	20	0	DL	0	20	0	DL	0
CW-693	BIO	WHITE OAK CK	FW															
CW-209	P	LAKE WATEREE	FW	20	0	DL	0	20	0	0	20	0	DL	0	20	0	DL	0

Water Quality Summary - Catawba River Basin

STATION		WATERBODY NAME	FIRST	CR	CR	CR	CR	CU	CU	CU	PB	PB	PB	PB	HG	HG	HG	HG
NUMBER	TYPE		CLASS	N	EXC.	MED.	%	N	EXC.	%	N	EXC.	MED.	%	N	EXC.	MED.	%
03050104020																		
CW-072	CS	BIG WATEREE CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050104030																		
CW-019	S	WATEREE RVR	FW	7	0	DL	0	7	0	0	7	0	DL	0	7	0	DL	0
CW-214	I*	WATEREE RVR	FW															
CW-206	P	WATEREE RVR	FW	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
CW-222	P	WATEREE RVR	FW	39	0	DL	0	39	4	10	39	0	DL	0	38	0	DL	0
SC-002	SC	WATEREE RIVER	FW	46	0	DL	0	46	13	28	46	1	DL	2	2	0	DL	0
03050104040																		
CW-077	BIO	FLAT ROCK CK	FW															
CW-078	BIO	GRANNIES QUARTER CK	FW															
CW-237	CS	GRANNIES QUARTER CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050104050																		
CW-075	BIO	THORNTREE CK	FW															
CW-228	P/BIO	SAWNEYS CK	FW	19	0	DL	0	19	0	0	19	0	DL	0	19	0	DL	0
CW-079	CS	SAWNEYS CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050104060																		
CW-229	P	BEAR CK	FW	18	0	DL	0	18	1	6	18	0	DL	0	18	0	DL	0
CW-080	P*/BIO	TWENTYFIVE MILE CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050104070																		
CW-223	S/BIO	LITTLE PINE TREE CK	FW															
CL-078	CS	LAKE, ADAMS MILLPOND	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-021	CS	BIG PINE TREE CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
03050104080																		
CW-238	CS	SWIFT CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050104090																		
CW-154	S/BIO	KELLY CK	FW															
CW-155	P/BIO	SPEARS CK	FW	19	0	DL	0	19	0	0	19	0	DL	0	19	0	DL	0
CW-166	CS	SPEARS CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050104100																		
CW-240	CS	COLONELS CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0

Water Quality Summary - Catawba River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050101190									
CW-197	P	LAKE WYLIE	FW	19	0	0	19	0	0
CW-192	S*	SOUTH FORK CROWDERS CK	FW	2	0	0	2	0	0
CW-152	P	CROWDERS CK	FW	19	0	0	19	0	0
CW-023	P	CROWDERS CK	FW	18	0	0	18	0	0
CW-024	CS/BIO	CROWDERS CK	FW	2	0	0	2	0	0
CW-105	S	BROWN CK	FW						
CW-696	BIO	BEAVERDAM CK	FW						
CW-153	S	BEAVERDAM CK	FW	1	0	0	1	0	0
CW-027	S	LAKE WYLIE	FW	5	0	0	5	1	20
CW-245	CS	LAKE WYLIE	FW	3	0	0	3	0	0
CW-198	P	LAKE WYLIE	FW	19	0	0	19	0	0
CW-201	P	LAKE WYLIE	FW	19	0	0	19	0	0
CW-230	CS	LAKE WYLIE	FW	3	0	0	3	0	0
03050101200									
CW-171	S	ALLISON CK	FW						
CW-134	S	CALABASH BRANCH	FW						
CW-694	BIO	ALLISON CK	FW						
CW-200	S	LAKE WYLIE	FW	1	0	0	1	0	0
03050103010									
CW-221	S	CATAWBA RVR TRIB	FW						
CW-014	P	CATAWBA RVR	FW	17	0	0	17	1	6
CW-041	P	CATAWBA RVR	FW	16	0	0	16	1	6
CW-016	P	CATAWBA RVR	FW	17	0	0	17	1	6
CW-016F	P	LAKE, FISHING CK RESERVOIR	FW	19	0	0	19	1	5
CW-057	P	LAKE, FISHING CK RESERVOIR	FW	19	0	0	19	0	0
CW-174	S	CATAWBA RVR	FW						
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	2	0	0	2	0	0

Water Quality Summary - Catawba River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050103028									
CW-247	CS	SUGAR CK	FW	3	0	0	3	0	0
CW-248	CS	LITTLE SUGAR CK	FW	3	0	0	3	0	0
CW-246	CS/BIO	SUGAR CK	FW	3	0	0	3	0	0
CW-226	P	MCALPINE CK	FW	18	0	0	18	0	0
CW-064	S*/BIO	MCALPINE CK	FW	1	0	0	1	0	0
CW-009	S*	STEELE CK	FW	2	0	0	2	0	0
CW-203	CS	STEELE CK	FW	3	0	0	3	0	0
CW-681	BIO	STEELE CK	FW						
CW-011	S*	STEELE CK	FW	2	0	0	2	0	0
CW-013	P	SUGAR CK	FW	19	0	0	19	0	0
CW-036	P*	SUGAR CK	FW	3	0	0	3	0	0
03050103038									
CW-176	P	SIXMILE CK	FW	19	0	0	19	2	11
CW-083	P*	TWELVEMILE CK	FW	3	0	0	3	0	0
CW-145	CS	WAXHAW CK	FW	3	0	0	3	0	0
03050103042									
CW-185	S*	CANE CK	FW	2	0	0	2	0	0
CW-151	S	BEAR CK	FW						
CW-047	S	GILLS CK	FW						
CW-131	S	BEAR CK	FW						
CW-210	BIO	CANE CK	FW						
CW-017	P*	CANE CK	FW	3	0	0	3	0	0
CW-232	CS	RUM CK	FW	3	0	0	3	0	0
03050103050									
CW-029	P	FISHING CK	FW	17	0	0	17	0	0
CW-031	BIO	FISHING CK	FW						
CW-005	P/BIO	FISHING CK	FW	18	0	0	18	0	0
CW-225	P*	FISHING CK	FW	3	0	0	3	1	33

Water Quality Summary - Catawba River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050103060									
CW-006	S*	WILDCAT CK	FW	2	0	0	2	0	0
CW-212	S	TOOLS FORK	FW						
CW-096	S*	WILDCAT CK	FW	3	0	0	3	1	33
CW-224	S*	FISHING CK	FW	2	0	0	2	0	0
CW-697	BIO	STONEY FORK CK	FW						
CW-695	BIO	TAYLORS CK	FW						
CW-654	BIO	FISHING CK	FW						
CW-007	BIO	FISHING CK	FW						
CW-008	P	FISHING CK	FW	15	0	0	15	1	7
CW-233	CS	FISHING CK	FW	3	0	0	3	0	0
CL-021	CS	LAKE OLIPHANT	FW	1	0	0	1	0	0
03050103070									
CW-227	S	NEELYS CK	FW						
CW-234	CS/BIO	TINKERS CK	FW	3	0	0	3	0	0
03050103080									
CW-084	BIO	CAMP CK	FW						
CW-235	CS	CAMP CK	FW	3	0	0	3	0	0
03050103090									
CW-088	S	GRASSY RUN BRANCH	FW						
CW-002	P/BIO	ROCKY CK	FW	14	0	0	14	1	7
CW-067	BIO	LITTLE ROCKY CK	FW						
CW-691	BIO	BEAVER DAM CK	FW						
CW-236	CS	ROCKY CK	FW	3	0	0	3	0	0
CW-175	S	ROCKY CK	FW						
03050104010									
CW-231	CS	CATAWBA RVR	FW	3	0	0	3	0	0
CW-040	S	LITTLE WATEREE CK	FW	1	0	0	1	0	0
CW-692	BIO	DUTCHMAN CK	FW						
CW-076	BIO	BEAVER CK	FW						
CW-208	P	LAKE WATEREE	FW	19	0	0	19	0	0
CW-207	P	LAKE WATEREE	FW	20	0	0	20	0	0
CW-693	BIO	WHITE OAK CK	FW						
CW-209	P	LAKE WATEREE	FW	20	0	0	20	0	0

Water Quality Summary - Catawba River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050104020									
CW-072	CS	BIG WATEREE CK	FW	2	0	0	2	0	0
03050104030									
CW-019	S	WATEREE RVR	FW	7	0	0	7	0	0
CW-214	I*	WATEREE RVR	FW						
CW-206	P	WATEREE RVR	FW	19	0	0	19	1	5
CW-222	P	WATEREE RVR	FW	39	0	0	39	0	0
SC-002	SC	WATEREE RIVER	FW	45	0	0	46	0	0
03050104040									
CW-077	BIO	FLAT ROCK CK	FW						
CW-078	BIO	GRANNIES QUARTER CK	FW						
CW-237	CS	GRANNIES QUARTER CK	FW	2	0	0	2	0	0
03050104050									
CW-075	BIO	THORNTREE CK	FW						
CW-228	P/BIO	SAWNEYS CK	FW	19	0	0	19	0	0
CW-079	CS	SAWNEYS CK	FW	2	0	0	2	0	0
03050104060									
CW-229	P	BEAR CK	FW	18	0	0	18	1	6
CW-080	P*/BIO	TWENTYFIVE MILE CK	FW	2	0	0	2	0	0
03050104070									
CW-223	S/BIO	LITTLE PINE TREE CK	FW						
CL-078	CS	LAKE, ADAMS MILLPOND	FW	2	0	0	2	0	0
CW-021	CS	BIG PINE TREE CK	FW	3	0	0	3	0	0
03050104080									
CW-238	CS	SWIFT CK	FW	2	0	0	2	0	0
03050104090									
CW-154	S/BIO	KELLY CK	FW						
CW-155	P/BIO	SPEARS CK	FW	19	0	0	19	1	5
CW-166	CS	SPEARS CK	FW	2	0	0	2	0	0
03050104100									
CW-240	CS	COLONELS CK	FW	2	0	0	2	0	0

APPENDIX B.

TMDL Development Plan for
Fishing Creek Reservoir,
Cedar Creek Reservoir,
and Lake Wateree

TMDL Development Plan for Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree

Introduction

Section 303(d) of the Clean Water Act requires states to develop a list of waters that do not meet water quality standards after required controls are in place. This list is often called the state's impaired waters list or the 303(d) List. The Clean Water Act further requires states to develop management plans called Total Maximum Daily Loads (TMDLs) for the listed waterbodies.

Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree are listed on South Carolina's 1998 EPA approved 303(d) as impaired because of phosphorus. Phosphorus is carried by rivers and streams into a lake or reservoir, where the nutrients may become available for plant growth. Excessive nutrient inputs can lead to oxygen declines, fish kills, imbalance of aquatic species and a general decline of the aquatic resource. Thus, the control of nutrients in streams is important for the health of our downstream reservoirs.

SCDHEC is working with several partners to develop a management plan for phosphorus in the Catawba River Basin. The development of the management plan includes an interim and a final phase. Studies and data available as of 1998 were evaluated to produce an interim management strategy. Additional studies are required to develop the final management plan or TMDL. The various activities described below comprised the TMDL development process.

INTERIM

Summary of data available as of 1998:

Lake Wateree Diagnostic Study, (SCDHEC, 1996.)

The purpose of this diagnostic Study was to compile information on Lake Wateree and its watershed and to determine the trophic condition of the lake and the water quality of influent streams. Data collected will serve as a baseline to which post implementation conditions can be compared.

The study found Lake Wateree to be the most eutrophic large lake in the state with some of the highest observed phosphorus concentrations in the state. Increasing trends in total phosphorus concentrations were observed in McAlpine Creek, Sugar Creek, and Wildcat Creek despite implementation in 1991 of South Carolina's phosphate detergent ban. The study further found that dissolved phosphorus averages 66% of the total in the headwaters of the lake. As a result of the conditions documented and the growth in the basin, effective control strategies for both point and nonpoint source pollution will be necessary to maintain or improve current conditions in Lake Wateree.

Water Quality Model and Monitoring Needs Assessment for Lake Wateree, SC, (Tufford, et al, 1997.)

Lake Wateree is the last in a chain of Catawba River reservoirs used for hydroelectric power generation, water supply, and recreation. Additionally, the land along the lake is a desirable place to live and supports a sizeable resident population. There is a growing concern over potential pollution of Lake Wateree by upstream and local development, industrial and municipal wastewater discharges, stormwater runoff (nonpoint source pollution), and other sources of pollution. Of particular concern is the potential impact from

rapid urbanization in the Charlotte-Rock Hill metropolitan areas upstream from Lake Wateree. The South Carolina Department of Health and Environmental Control completed a diagnostic study of Lake Wateree in 1996 and concluded that the lake is currently the most eutrophic lake in South Carolina and sensitive to additional nutrient loading. As a result the Lake Wateree Home Owners Association (WHOA) provided funds for the University of South Carolina to develop a water quality model to simulate seasonal dynamics in Lake Wateree and to predict responses to changes in nutrient loading.

A one-dimensional, segmented model of Lake Wateree was developed using the "Water Quality Analysis Simulation Program" (WASP5). The model was designed to simulate hydrodynamics and water quality in different areas of Lake Wateree from the inflow of the Catawba River to the forebay area near the dam. The model focuses primarily on conditions in the mainstem of the reservoir but also includes dynamics in one of the main tributary embayments (Big Wateree Creek). The model was calibrated and verified using SCDHEC data.

Nutrient loading analysis by the model suggests that existing conditions in Lake Wateree are approaching the maximum recommended levels of algal biomass for southeastern reservoirs. The model predicts that further increases in nutrient loading due to wastewater discharges and/or nonpoint source runoff will increase the likelihood of frequent algal blooms and degradation of water quality. High turbidity and residence time of water in the lake can also limit algal response to nutrient loading. If future reservoir operations or turbidity change these limitations, the resulting phytoplankton growth may change as well.

Point Load Estimates

The loading of total phosphorus from permitted point sources was estimated using 1997 discharge monitor report (DMR) data. Loadings were estimated for both South Carolina and North Carolina point sources.

Total Phosphorus Fate and Transport

The United States Geological Survey (USGS) recently completed a study of the Catawba River from the Wylie Dam tailrace to the headwaters of Fishing Creek Reservoir. The objectives of the study were to develop hydrodynamic and water quality models that use a dynamic flow to simulate the transport and fate of nutrients, biochemical oxygen demand (BOD), and dissolved oxygen in the Catawba River. Water chemistry and flow data collection from existing sources, two dye tracer studies, and additional water chemistry monitoring were required for the modeling component. The BRANCH Model (Shaffranek and others, 1981) was used to simulate flow and provide the hydraulic data required by the transport model. The Branched Lagrangian Transport Model (BLTM) (Jobson and Schoelhamer, 1987) was used to simulate the fate and transport of selected water quality constituents. The six major NPDES discharges into the Catawba River were included in the BLTM. Although the final report for this monitoring and modeling effort has yet to be published, the study found that instream nutrient levels were potentially influenced by plankton and periphyton activity in the reach considered. Findings of this study allow scientists and regulators to study the potential fate and transport of phosphorus after it enters the Catawba River.

Interim Nutrient Management

SCDHEC recognizes that current loading of total phosphorus to Fishing Creek Reservoir, Cedar Creek Reservoir, and Lake Wateree resulted in the listing of the waterbodies on South Carolina's 303(d) List for total phosphorus. Loading estimates suggest that NPDES discharges contribute significantly to the total phosphorus load in the Catawba River. Prior studies of Lake Wateree found nutrient reductions are necessary to protect the lake from nuisance algal blooms and possible fish kills. As a result, SCDHEC plans to include total phosphorus limits on NPDES permits in the Catawba River Basin with flow greater than or equal to 50,000 gallons a day as permits are reissued in year 2000. SCDHEC began placing phosphorus limits on all new and expanding dischargers regardless of size in the basin in 1998.

Steps are currently being taken to develop a long term management plan (also known as a Total Maximum Daily Load or TMDL) for these reservoirs.

FINAL

Lake Wateree Nutrient Field Study

USEPA's Science and Ecosystem Support Division (SESD) located in Athens, GA plan to perform additional monitoring for these lower Catawba reservoirs in year 2000. The purpose of their study is to provide additional data for the University of South Carolina to use in the calibration of the reservoir nutrient response component of the basin model.

The University of South Carolina Catawba River Basin Study Using WARMF

The University of South Carolina (USC) is performing a nonpoint source assessment and modeling study of the Catawba River Basin funded by USEPA through SCDHEC's Nonpoint Source Management Program. Their study includes four components: nonpoint source water quality field studies; watershed/nonpoint source modeling using Watershed Analysis Risk Management Framework model (WARMF); nutrient response model using WARMF or existing Lake Wateree model; and consensus building for load allocation using WARMF.

NPS Water Quality Field Studies. The USC will conduct intensive storm runoff sampling in representative sub-basin(s), possibly the Rocky Creek watershed. Sampling efforts will rotate among the most critical watershed sub-units so that runoff data from a broad range of basin land use types is obtained. Stormflow samples will be collected by automated sequential samplers (ISCOs) deployed at various locations including the watershed outlet and an upstream location with more limited land use type. The automatic samplers will integrate storm flow discharge into rising limb, peak flow, and falling limb portions of the storm hydrograph. The data collected in these field studies will be used in the watershed/NPS model.

Nutrient Model Refinement. One aspect of the USC study will be to develop a nutrient response model for Lake Wateree. As the nonpoint source water quality field studies and the watershed nonpoint source modeling using WARMF progresses, a decision will be made as to the appropriate nutrient response model to use. Two possible models include WARMF's reservoir model or the

existing WASP5 reservoir model adapted to Lake Wateree for WHOA. Both models will require refinement for purposes of this TMDL.

Watershed/NPS Model. WARMF will be used to model point and nonpoint source nutrients in the Catawba River Basin. Existing water quality data from SCDHEC, NCDENR, and Mecklenburg County Department of Environmental Protection, as well as data from the NPS water quality field study described above will be used to calibrate and verify the NPS runoff and stream water quality components of the WARMF model.

Load Allocation. The final phase of the USC Study will be to apply the decision support system of WARMF to compute various load allocation scenarios and to guide negotiations among stakeholders in arriving at a feasible watershed management plan. SCDHEC watershed managers will work with NCDWQ and USC to assemble a working group of stakeholders in the watershed including representatives from Duke Power Company, water and sewer utilities, industry, homeowner associations, environmental groups, and regulatory agencies from South Carolina and North Carolina. The stakeholders will be active in the allocation process.

The Watershed Analysis Risk Management Framework or WARMF model recently developed by Duke Energy and Systech Engineering for the Catawba River basin is a state-of-the-art watershed simulation model. The core component of WARMF is a physically based, dynamic simulation model which combines information on land use, soils, and meteorology to predict runoff and NPS loads from a network of catchments. The model further combines these results with information on point source discharges and reservoir release rates to route water through the basin and to simulate water quality dynamics in the streams and lakes. Watershed/water quality analysis can range from headwater stream segments to regional basins. Sub-basin aggregation (or disaggregation) needed for specific model applications can be handled within the model framework. All components of the model are integrated by a Windows-based graphical user interface, which provides menus for inputting model parameters and data sources. The model displays simulation output in color maps, graphics, and/or spreadsheets.

Numeric Nutrient Criteria

In order to determine the acceptable load of phosphorus to the watershed a numeric endpoint for phosphorus or other lake health indicator is needed. The Clean Water Action Plan announced by Vice President Al Gore in February 1998 called for USEPA to develop numeric nutrient criteria based on different types of waterbodies (river, estuary, lake, wetland) and the ecoregion in which they are located by the year 2000. USEPA expects states to adopt the criteria as water quality standards. As it becomes clear what the USEPA criteria for phosphorus in lakes will look like, an endpoint for the TMDL can be established. The acceptable load of phosphorus to the watershed will be based on USEPA's nutrient criteria.

TMDL Development and Implementation Plan

The TMDL development process described above and results of the various studies in the watershed will be documented and submitted to USEPA as a formal TMDL. The TMDL will be placed on public notice prior to its approval. SCDHEC, NCDWQ, and other stakeholders will develop an implementation plan for the TMDL.

REFERENCES

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APPENDIX C.

Watershed Maps

Waterbody Index

Facility Index